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Chamber of Commerce of the United States of America. Fabricated Production Department

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PERPETUAL INVENTORY OR STORES CONTROL



FABRICATED PRODUCTION DEPARTMENT
CHAMBER OF COMMERCE OF THE UNITED STATES
WASHINGTON, D. C.

FOREWORD

Continuity of operation is accepted as an important element in successful production.

Seasonal unemployment and shut-downs for physical inventories are being relegated to the rear.

Waste in the handling of men and materials can be avoided by exercising reasonable care and the use of proper system.

Our design in issuing this pamphlet, which was prepared by Mr. Arthur Lazarus, Chief of the Cost Accounting Bureau, is to contribute helpfully to the study before us and to suggest from our experience and that of others some of the stop-gaps of loss.

E. W. McCULLOUGH,

Manager, Fabricated Production Department.

March 15, 1922.

PERPETUAL INVENTORY OR STORES CONTROL

In a recent issue of *The Nation's Business* appeared this significant statement by Samuel Vauclain, President of the Baldwin Locomotive Works, Philadelphia, Pa.:

"I had the pleasure of giving the Director of Public Works a very complete lecture upon how to run a workshop and how to handle workmen. I illustrated by throwing some money on the ground, which the men all ran after to pick up. This explained very forcibly the fact that everybody would scramble to pick up money, but that nobody there seemed to have the slightest desire to pick up the machinery lying around, all over the shop floor, each piece of which was more valuable than any of the money which I had scattered. They all saw the point at once, and thought it was a good way to demonstrate the reckless manner in which they were handling things. The Director announced that they would be corrected at once and thanked me for the illustration, saying that they had never before thought of it in that light."

The above quotation refers specifically to the treatment of equipment, but what is there stated may be applied with equal truth and propriety to the handling of supplies and raw and semi-finished materials. When capital is in the form of cash it is carefully protected, its receipt and disbursement safeguarded, its custodians held to a strict accounting, but once this capital is converted into materials there is a tendency to become lax, to lose sight of the value of the investment, to husband the capital less diligently, to tolerate practices that are wasteful, inefficient and needlessly expensive.

There is something at fault with our business methods when material is purchased far in excess of production requirements,

TERMINOLOGY: Stores—Limited to raw and semi-finished material; Perpetual Inventory and Stores Control System—Used interchangeably; Perpetual Inventory Form—Used synonymously with Stores Ledger and Balance of Stores Form.

when material becomes obsolete before it is even processed, when production lags for the lack of material or is throttled by the uneven flow of material through the departments, when a careful check of material receipts is not provided, when material is not protected or kept accessible for use, when foremen and workmen help themselves without authorized requisitions and material is consumed without any record made for cost purposes.

These are conditions from which a great many establishments are not entirely or even comparatively free.

It is easy enough to work out a theoretically perfect system of material control. There are many such, but the average enterprise will not support, nor does it require, a system that calls for a large number of forms. Such a system is expensive to operate and its use hampers rather than helps production.

The first essential of a correct stores control system is adequacy, and after that the greater the simplicity the better. Business conditions today will not permit of unnecessary routine and the multiplication of forms which tend to clog production. One large company keeps three sets of material records, all containing essentially the same information, and the management has come to the realization that here is unnecessary duplication and proposes to eliminate one set of these records. "We have recently made a complete review of our stores control methods," writes an executive, "and the result has been, no doubt, similar to that in other industries, we have reduced rather than increased forms."

Executives are insistent that stores control shall be centered on the principal facts and not lose itself among non-essentials. Thus, one large company charges off when purchased items such as nuts, bolts and screws which in that particular establishment are very minor items of supply. An item which costs ten cents or over is charged when requisitioned. However, even in items of less value than ten cents, adequate record of the quantity on hand is maintained.

In accordance with the foregoing, that which will be presented here will be a simple rather than an elaborate stores system.

Advantages of a Material Control System

In the summary given below of advantages of a material control system no particular significance attaches to the order in which such advantages are stated. They are all important. Each establishment will determine for itself by its particular needs and the character of the industry the paramount object to be gained.

In the first place a stores control system should aid in keeping the investment in materials and supplies to a minimum consistent with efficient operation. Consumption of material is not static but fluctuates with production.

The supply of specific commodities on hand is largely regulated by conditions of purchase, production and demand, and as these change so should the level of supply. When goods are scarce and deliveries uncertain a larger reserve of material is necessary than when goods are plentiful and deliveries dependable, and obviously when demand falls below actual or planned production future commitments for material must be curtailed.

By simply ceasing to purchase, a general reduction of material on hand can be effected, but to this method is attached the risk of running out of necessary material. The stores control system will readily give the supply on hand of specific items and a complete record of their consumption, so that adjustments may be made where the supply is top-heavy or the reserve unnecessarily large. Thus, one company found it necessary to maintain a year's supply of steel files when files were at a premium; now it finds that files are more easily obtainable and that its consumption of this item has dropped, consequently a three months' supply is ample.

But a stores control system can aid a minimum investment in material in another direction, for a well planned system of material control will do more than fill and record the demands of foremen. The attempt will likewise be made to guide the selection of stock so that there may not be a needless range of variety or a surplus of stock. The subject of a minimum investment in material is closely related to the subject of standard sizes and varieties. The following are typical items which an English authority suggests as lending themselves to such a standardization:

Bar, Steel and Brass.....	Rounds, Hexagons, Squares and Flats
Screws, Steel and Brass	Round Head and Countersunk Head
Studs, Steel	
Bolts	Hexagon Head
Pins	Taper and Split
Washers, Steel, Iron and Brass	
Nuts, Iron and Brass	Hexagon
Wood Screws, Iron and Brass.	Round Head and Countersunk Head
Files, Iron and Brass	Hand, Flat, Half Round, Warding Square, Three Square and Round
Hammers, Iron and Brass....	Machinists' Hand, Riveting, Lead
Hammer Handles	
Mallets, Hide and Boxwood	

Lists detailing the standard sizes may be conveniently issued as blueprints to all departments, or a material catalogue prepared in which each size and variety selected as a standard will be detailed therein and given a separate stock number. The requirements of the departments will be restricted as far as practicable to the sizes and varieties carried. The selection of odd sizes and kinds rests frequently on the caprice of the individual rather than upon sound industrial practice. An efficient material system will tend to eliminate distinctions that are not differences and thus aid in this additional manner to reduce the inventory to a minimum.

The second requirement of an adequate stores control system is to supply men and machines with material in the manner, at the time, and in the amount required.

The investment in materials must be kept low, but not so low as to interfere with production. Machines must not remain idle because of a lack of necessary material. The material control system takes on an increased importance where there are numerous parts entering into production, the lack of any one of which is sufficient to check operations and throw the production program out of balance.

Parts must not only be physically available in the storeroom, but must converge to the point and at the time desired in production. An undue accumulation of material in the course of production will serve to interrupt the flow of production. The costliness of the sluggish movement of materials is not generally recognized, but an enterprise is impoverished by it as an individual suffering from a weakened circulation.

Economy of material investment, particularly of parts, can-

not be determined on a strictly interest charge basis. There is something bigger at stake—the most economical use of production facilities. A three months' supply of a specific part may be a high enough level to meet the usual demand, but a six months' or a year's supply may be fabricated far more cheaply and permit of greater plant output.

Economy demands that work be put through in adequate lots. Dorr E. Felt, President of the Felt and Tarrant Manufacturing Company, Chicago, Ill., writes:

“We cannot start a job of 10,000 machines and make just the parts for 10,000. If we did some machine tools would be busy only two months a year, so we make parts enough of one particular kind for perhaps two years, according to the number in the machine, the amount of work on it, the fitting of its production into the tool schedule, etc. There are some parts of which we consume enough to keep one or more machines running continually on certain operations. That simplifies matters very much. Even with such a part it may require say fourteen operations. Six or a dozen of these operations may be done on machines which are never changed to other work, while the other operations have to be fitted into machines utilized for a variety of other work.”

In short runs of material the setting up time is disproportionate as compared to the time of operation. A multigraphing department of three operators and a planning clerk was constantly behind in its work. Inquiry developed the point that the various departments were ordering small quantities which required as much time to set up as to execute. Longer runs were established for standard forms and in a short time it was possible to dispense with the planning clerk and one operator.

The subject of longer runs is bound up intimately with the subject of the standardization of parts and products. If differences that are not fundamental are eliminated so that one part may serve where three formerly were required it is obvious that longer runs will result. An interesting illustration of this was recently given before the Taylor Society by W. E. Freeland, Sales Engineer of the Winchester Repeating Arms Co., New Haven, Connecticut. He found that fishing reels were manufactured by that company in both brass and nickel plated styles and by placing a part in the storeroom in unpolished condition it could serve both the brass and nickel plated reels. When an order

came through to assemble nickel plated reels the part could be drawn from the storeroom and nicked as a part of the assembling. Mr. Freeland goes on to state, "By reducing the number of items we are enabled to place factory orders for larger lot sizes and thus obtain a better flow with a decrease in the inventory of work in process."

A stores control system that is functioning effectively will facilitate the full and free operation of a plant under even pressure. Such a stores control system will combine a frequent scrutiny of material, a careful determination of material requirements upon broad rather than narrow considerations, a persistent tracing of purchases and a skillful routing of material through the departments, though all these may not be primarily the functions of the stores department.

The third service of the stores control system is a proper conserving of the material investment. This involves checking incoming material for amounts, quality and condition, placing material where it can be readily found and where it will be accessible for use, protecting the material against climatic conditions and, if fragile, against breakage, adopting the proper precautions against theft, and safeguarding the issuance of material to the factory. The detection of breakage and waste has more than once been made difficult through lack of a proper control of material issues.

A fourth advantage of the stores control system, an integral part of which should be a perpetual inventory, frequently checked by actual tests of quantities on hand, is that such a system will tend to make unnecessary the expensive, burdensome and withal inaccurate annual physical inventory, with its general disorganization and shutting down of the plant. How this is accomplished will be described later.

In the fifth place, a stores control system is an essential part of accurate accounting for material, affording as it does a comparison of actual material receipts with purchase requisitions, a record of authorized issues of material to the factory, a comparison of actual issues with estimates of quantities previously laid down, as well as information making possible an accurate allocation of the cost of material to the proper departments, jobs or processes.

Lastly, a well planned stores control system will economize storage space. This is of extreme importance to businesses that

are growing and are hard put for available room. Space economy has interesting adaptations. The customary method of storing steel lengths is in horizontal racks. A few years ago a Detroit steel concern established a model warehouse on the principle of storing steel lengths vertically and found the arrangement saved storage space and rental charges.

Extent and Range of a Stores Department

A stores control system may be operated by one clerk in connection with other services, or the responsibility may require an extensive department, all of which will depend entirely upon the size and character of the establishment. Thus, in a large automobile plant the stores department has supervision of rough and finished parts rooms, the operation of receiving rooms, supervision of internal trucking, the maintenance of industrial trucks, the storage and supply of all material containers such as tote pans, steel boxes, and racks; the segregation, classification and shipment of all scrap, car parts, castings, bearings; the ordering and storage of all miscellaneous shop supplies, oils, chemicals, etc., the supervision of interdivisional shipping and the keeping of material records.

Doubtless the nature and size of this enterprise require such a refinement and multiplication of the duties of a stores department, but to expect a small or even relatively small factory, or a factory producing a simple product, even to approach such detail is preposterous. Theorists fall down by expecting too much of the average establishment, by loading it with too much system. There ought to be a happy medium in the handling of material where chaos will give way to control, waste to conservation, and chance to ordered planning.

The extent and range of the stores department will vary in different industries, according to the number of parts entering into production, and according to the fragility, bulk or minuteness of the material.

There are even industries such as paper and paint where the bulkiness and character of the product and the construction of plants do not permit of the adoption of customary methods of stores control. But it is just as important for these industries to possess accurate information concerning the investment in and consumption of material.

The Budget Cost System for Paper Mills prepared for the Cost Association of the Paper Industries makes the following recommendation for the handling of material in that industry :

“For recording the quantity of raw materials used, whether in manufacturing prepared material or for direct consumption during the conversion of the product, two methods are in general use. By one of these methods the raw material is weighed, counted or measured at the time of its use, and a record made of the quantity. By the other method the weight of the material used is recorded from tags attached to each unit of the material at the time of receipt.

“These tags should show whatever information is valuable such as lot number, grade, shipper, etc., and always the weight when received. The tag method is particularly valuable in the case of pulp containing varying percentages of moisture and in the checking of tare and out-throws from baled stock. Where tags for wet pulp consumed are delivered to the Cost Department they will, of course, show the net weight at the time of receipt, regardless of the loss in percentage of moisture during storage, and the percentage found by test at the time of receipt can be applied giving as nearly accurate dry weight as it is possible to obtain. Whether the tag system is used or material is weighed or counted, as in the case of uniform packages of fillers, it is a comparatively simple matter to devise forms for recording and assembling the material used in a particular run so that the material cost may be ascertained. Credit should be taken for all out-throws of value before making the material charge.”

In the paint industry, too, the regular procedure of store-keeping is not generally observed owing to the following factors: the bulkiness of raw material, its high shrinkage percentage, the liquid form of much of it, as well as tradition. Workmen help themselves to what they require, but they are expected to take the poundage and gallonage indicated on working formula cards. A report of material used in terms of mixes is each day rendered by the workman to his foreman, who combines this information in one report. This report of material consumed serves the cost department for charging purposes, and the stock record department for posting to the perpetual inventory records. As the supply indicated available on these perpetual inventory records reaches the minimum balance, report thereof is made to the purchasing department.

Beyond citing the stores practices of the paper and paint industries for such suggestions as they may contain, no further reference will be made to industries not amenable to a strict and scientific control of material.

Contents and Arrangement of the Storeroom

The contents of the storeroom will vary from industry to industry. For example, the storeroom of a steel fabricating plant will contain iron and steel, non-ferrous metals, timber and supplies of the following kinds:

- Building supplies and electrical supplies
- Machinists' and pipe fitters' supplies
- Foundry supplies
- Fuel and oil
- Hardware sundries
- Implements and utensils
- Liquids and greases
- Paint materials
- Stationery and paper
- Standard fittings, bolts and fastenings

The storeroom should also contain rough and finished parts ready for assembling.

In all control of material it is necessary to retain the identity of goods and to know their location. This is accomplished by a material classification worked out usually upon a combined symbol and decimal code. To aid the identification of material, bin aisles should be captioned and their general contents noted, and likewise a bin tag descriptive of the articles and the quantity on hand should be attached to the front of each bin. For the ready identification of material, especially of small parts, a sample of the contents of the bin may be nailed to the front of the proper section. By this method the storekeeper is able to visualize material on hand.

Those items which are a regular and constant item of supply should be given a permanent storeroom location, but it would unnecessarily increase vacant bins permanently to locate items which are carried irregularly. Such fluctuating items can be given a bin location as the occasion arises and this location should be properly indexed.

Material in the storeroom will be grouped in such a way as to economize storage space and to save unnecessary transport to

the factory department. To help in placing material efficiently tables are sometimes supplied storekeepers showing how many cubic feet of space per given quantity are required to accommodate each item of material. Articles for which there is a steady demand will be held readily accessible for issue. A grouping can be profitably made between wholesale and retail materials. "Wholesale materials" are the large packages, "retail" the broken packages. A modification of this grouping is to have a specified amount of material in the current section of the material room and all surplus material in the surplus material bins. Or, the grouping of material may be a functional one. Thus, the material will be kept in separate sections by departments. In the automobile factory previously cited all parts going into the clutch assembly will be found in one section of the stores room, the parts going into the transmission assembly in another section of the stores room, and similarly with the parts of all other assemblies.

Unnecessary handling of material is avoided by keeping binned material whenever possible in moveable containers, and placing piled material on skids, ready to be hauled away by trucks which elevate skids with loads, thus eliminating piece by piece handling.

Overflow of material should not be placed on top of racks or piled on the floor but placed in separate bins, and a notation of its location made on the master bin tag.

The storeroom equipment should be uniform, elastic and adapted to meet the requirements of the material handled. Under the multiple unit plan of bin arrangement flexibility is gained by means of standardized inserts. These permit a bin section to be a whole bin, or four, eight or sixteen small bins, and the bin spaces are adjusted to varying needs. The bins should not be beyond easy reach, and smaller in the upper than lower sections. In the upper bins small articles will be stored while bulkier material will be stored in the lower bins. Steel shelving gives the greater space volume, but is more expensive than wood.

To avoid undue accumulation of obsolete material, and to assure the consumption first of earliest purchased material, the double bin plan has been employed. Adjacent bins are provided for each item of stores, one called the receiving bin and the other the issuing bin. The material in the receiving bin is not touched until the supply of the issuing bin is exhausted. Then the is-

suing bin becomes a receiving bin, and the receiving bin is converted into an issuing bin.

The Routine of Material Control

The routine of material control centers in the safe and orderly custody of goods and this requires their identity, location, safe housing, orderly arrangement, etc. The stores department must preferably not issue anything from stores without a properly signed requisition. Whatever exact procedure is adopted, the guiding principle should be a control of the quantities of material to be issued upon a given job or to a particular department. Otherwise the factory will draw in excess of requirements to cover spoilage.

The following typical steps cover the routine of controlling material:

1. The executive responsible for the ordering of material makes out a regular purchase requisition.

2. The purchasing department writes out a purchase order, a copy of which is sent to the stores department for filing in the receiving room.

3. Material is received in the receiving department, loads are checked, the material is unloaded, opened, counted, inspected, recorded against proper purchase order, the material is removed to the proper stores location and proper receiving bin location, and material ledger entries made.

4. Material is issued to the various departments on presentation of authorized requisitions, proper bin tag deductions made, and issues of material sent to the cost department for purposes of cost allocation.

5. Material is from time to time scrutinized, counted and checked with stores records and the shortages reported to the purchasing department. This checking will be particularly valuable in disclosing material for which there is infrequent demand and the supply of which can be curtailed. By the application of this principle to finished stock, the perpetual inventory records of one manufacturer showed at a glance that he was carrying 17,000 items, of which only 600 were active and he proceeded thereupon to eliminate most of the slow moving items.

Forms for Material Control

There is a natural temptation to multiply the forms used in material control. This tendency, if unchecked, will involve the organization in much "red tape" which will largely nullify advantages to be secured from the stores procedure. It is difficult, however, to control material effectively without the following minimum series of forms:

1. **PURCHASE ORDER**, the make-up of which is so familiar that a specimen form or description is not given. A copy of the purchase order is sent to the stores department, and goods as they are received are checked against this order. To assure accurate count and weight, as well as to prevent possible collusion, some establishments use a separate goods received voucher, which is also used to inform the various departments of the arrival of material. The ordering out of material is then squarely placed upon the heads of the operating department or the planning department. The independent goods received voucher gives the list of material received, the department ordering the same, the date ordered, the date received, and a description of the articles and lot numbers.

2. The **BIN TAG** attached to the front of each bin identifies the bin contents, provides for the material symbol, if any, quantity on hand, material receipts and disbursements, and the minimum quantity for re-order purposes. The bin record affords a convenient check upon the stores record, or as hereafter termed, the perpetual inventory record. It likewise enables the storekeeper to know readily what material he has on hand, without each time making a physical count. Those storekeepers who object to the clerical work necessary to keep up the bin records may very well pause to consider whether they are not keeping records that are far less helpful and more clearly dispensable.

3. The **MATERIAL REQUISITION** is the storekeeper's authority to issue material. This requisition may call for the following information: the name of the department requiring the material, the requisition number and date, signature place for storekeeper, the charge by account, symbol, department or order, the quantity desired, description of article, the purchase order number, stores symbol, unit price, value of goods requisitioned, and a place for the signatures of those approving the requisition and receiving the material. When a requisition is filled the storekeeper forwards the same to the inventory clerk, who posts

SIMPLE FORM OF PERPETUAL INVENTORY

SIMPLE FORM OF PERPETUAL INVENTORY																SHEET NO.	
NAME OF COMMODITY														CLASS		MINIMUM QUANTITY	UNIT
DESCRIPTION														SIZE			
PURCHASE ORDERS				RECEIVED					ISSUED					BALANCE			
NO.	DATE	QUANTITY	PURCHASED FROM	P.O. NO.	INV. DATE	DATE REC'D	QUANTITY	UNIT DEL'D PRICE	VALUE	DATE	JOB NO. OR DEPT.	REQ. NO.	QUANTITY	UNIT DEL'D PRICE	VALUE	QUANTITY	VALUE

ACTUAL COUNT IS INDICATED BY RED FIGURES IN BALANCE COLUMN

the withdrawal of goods on his records and sends the requisition to the cost department for purposes of cost allocation. Of course, before forwarding the requisition, the storekeeper must post the bin tag. A proper checking of the consumption of material requires that no issues be made without a written order on the storekeeper, same to be properly receipted.

4. The PERPETUAL INVENTORY FORM is the pivotal point of the stores control system. Through this record, on which additions and withdrawals of material are noted, it is possible to tell what material is at hand at any time without a physical inventory.

The form of perpetual inventory will vary with the requirements of individual plants, hence the presentation of one ideal form cannot be entirely successful. Instead, two forms are given, one simple, the other in detail. The first is a modification of a form now used by a large manufacturer of paper products, the second a modification of a form in use by an engineering organization specializing in heating apparatus.

The simple form (page 15) provides in its heading for the name, description, size and classification of the commodity, as well as for the unit of measurement and the minimum quantity to be kept on hand. The body of the form has four main sub-divisions relating to purchase, receipts, issues and the balance of material on hand. Under "Purchases" are given the name of the seller, the number and date of the purchase order and the quantity ordered. Under "Receipts" the purchase order number is repeated, invoices and received dates given, and both quantities and values shown, the latter by units and in bulk. Under "Issues" there are columns for the date of issue, the requisition number and job or department to be charged with the issue, and likewise the quantities and values of material issued. The Balance section gives only total values and quantities. As indicated at the bottom of the form, the balances arrived at by actual count are shown in red in the "balance" column.

Before describing the information called for by the detailed form of perpetual inventory (page 18) it should be noted that the simple form shows quantities and values whereas the detailed form provides only for quantities. The propriety of showing both quantities and values on the perpetual inventory form has been much discussed. In its favor it is urged that duplication of records is thereby avoided and that the form can be used as well for the

purpose of inventory pricing. Moreover, it gives the storekeeper at a glance the amount of money tied up in any particular item, which information assists the storekeeper in keeping a minimum investment in materials. The following two objections are most frequently urged to combining quantities and values in the one form:

(1) That those responsible for the control of material must of necessity frequently refer to the perpetual inventory and that this interferes with the work of the accounting department controlling the recording of values.

(2) That a material control system, to be efficient, must be current, that goods must be recorded as and when received, but that frequently goods are received before invoices therefor are passed or are at hand, all of which creates confusion when both quantities and values are sought to be recorded on the perpetual inventory form.

In practice it works out substantially in this way. Where the stores requirements are relatively small, quantities and values may be advantageously shown. Where there is a considerable range of material, which necessitates the careful watching of the movement of material so as to avoid shortages or excesses, it is preferable to show only quantities.

Again there is a noticeable difference in the two forms of perpetual inventory in the attention paid to the consumption of material. The simple form shows merely a re-order level; when material reaches or falls below an established minimum quantity, a purchase requisition is immediately put through. This is sufficient because the main item of supply, paper in the form of newsprint rolls, is standard as to size, quality and variety, the supply is readily accessible and assured, the demand fairly stable and there is no risk of the stock becoming obsolete or shop worn.

The engineering practice of the firm using the more detailed form of perpetual inventory develops a considerable variation in material requirements. Over-stocking of items eventually means the carrying of obsolete and non-standard material and the incident loss of so doing. On the other hand, the supply of material has at times been extremely uncertain and difficult to gauge or control, and coupled with all of this is the wide fluctuation in the demand for the products manufactured; hence the provision in the heading of the form for the annual consumption

DETAILED PERPETUAL INVENTORY FORM

FOLIO NO.
LEDGER ACCT.
SUB ACCT
NORMAL STOCK ABOVE REQUIREMENTS
MAXIMUM STOCK
MINIMUM STOCK

NAME OF ARTICLE	PATTERN OR DIE NO.	DRAWING NO.
DESCRIPTION		
LOCATION - SHOP DEPT.	RACK NO.	BIN NO. SPACE NO.

PREVIOUS ANNUAL CONSUMPTION - 1917 1918 1919 1920 1921 1922

ORDERED			RECEIVED INTO STOCK				ALLOCATIONS					USED				ON HAND	
DATE	PURCHASE ORDER NO.	QUANTITY	RECEIVING SHEET NO.	PURCHASE ORDER NO.	DATE	QUANTITY	CONTRACT NO.	DATE REQUIRED	QUANTITY	CHECK ON QUANTITIES AS USED	AVAILABLE OVER REQUIREMENTS	CONTRACT NO.	REQ. NO.	REQ. DATE	QUANTITY	DATE	QUANTITY

of previous years so that present requirements may be tolerably estimated. There are, moreover, established maximum as well as minimum quantities to be carried and an approximation made of the percentage of material to be carried above requirements. Not content with these provisions to safeguard the continuous supply of material as well as the minimum profitable investment therein, there is provision in the body of the form for the allocation of material to particular contracts. Where the usage and demand for material are irregular in character this allocation of material is of considerable importance. Minimum and maximum quantities alone will not do.

A story is told of a firm manufacturing perfume boxes receiving a large order for a certain item. The machines were set, manufacturing duly started and the parts came through nicely for assembling. The last operation of all was to insert a canary colored lining. All the other material requirements were standard in character, but there had been little demand for the canary colored lining and, though minimum and maximum quantities were correctly set, there was not sufficient lining at hand to take care of this irregular demand. If the practice of allocating material to manufacturing order had been used for items where the demand was irregular, that is, if the amount of material required had been earmarked against the material available, either on hand or on order, this shortage of material would have been detected immediately, a purchase order shot through, and the time lost in dismantling equipment, waiting for lining and resetting the machines would have been spared.

Allocation is not carried through for material wanted in a rush, or not required for a long time, or the demand for which is fairly constant. Where, however, the demand fluctuates and sufficient time is given to provide for such fluctuation, the allocation of material is of considerable value.

Such allocation is accomplished by adding the material called for in manufacturing and shipping orders to the "allocation" column of the perpetual inventory form. The difference between the material on hand and due on order, and the material allocated gives the balance available over requirements. If this balance available is less than the established minimum quantity of material a purchase requisition is put through to make good the deficiency.

For the ready identification of material the heading of the

PERPETUAL INVENTORY TEST					GENERAL STORES SUPPLIES		CLASS
COMMODITY						SIZE	
DATE CHECKED	STORES TAG BALANCE	MATERIAL ISSUED NOT POSTED	ACTUAL STOCK	PERPETUAL INVENTORY BALANCE	CHECKED BY	REMARKS	

detailed form (page 18) provides the shop or department location, the rack, bin, and space number, as well as the pattern, die and drawing number. To assist in maintaining the ledger control, space is provided for the ledger account and sub-account. The body of the detail form is divided into five sections—Ordered, Received Into Stock, Allocation, Used and On Hand. Additional comment is unnecessary as to the sections headed Ordered, Received Into Stock, and Used and On Hand. The section headed Allocation calls for the following information—the contract or order number, the date the material is required, the quantity required, and a check of quantities as used, and a computation of the amount of material on hand over requirement.

5. The PERPETUAL INVENTORY TEST is an important link in the chain that makes less frequently necessary the burdensome and often inaccurate annual physical inventory. Recently a storekeeper termed the annual physical inventory a nightmare and a newspaper of the solid and non-sensational type carried a headline, "The spectre of inventories is again stalking the business men of the country." At all events, the annual physical inventory surely entails a general dislocation of plant and frequently a complete shut-down lasting as much as three to seven days, and then the results are not dependable. Hence the desirability of eliminating the annual physical inventory, if that is possible.

This is accomplished by independently checking the material indicated as on hand on the perpetual inventory and bin tag records with a physical count of selected items of stores, and noting and correcting any discrepancies between stock actually on hand and the quantity shown by the bin tag and perpetual inventory records. These inventory tests are made periodically and systematically, preferably at times when the supply of material selected is lowest, and the attempt is made to cover each item of supply at least once a year and important items more often. It is possible by these tests, as supplementary to the bin tag and perpetual inventory records, to secure an accurate count of material without the burdensome annual physical inventory. The form of inventory test shown herewith is substantially that used by a large organization which has entirely abandoned the practice of taking an annual physical inventory, and relies exclusively on its perpetual inventory records plus these inventory tests. A personal examination of its records shows surprisingly

few discrepancies between the stock on hand as reflected by the inventory tests and the stock called for by the perpetual inventory and bin tag records.

The form (page 20) calls for the following information: The general nature of the supplies, the particular class, the name of the commodity, its dimensions or description, the date upon which count is made, the balance shown by the stores tag, the stock issued but not posted (which is secured from pending requisitions), the actual stock on hand as shown by a physical count, the amount called for by the perpetual inventory balance, the name of the person checking the item and space for remarks.

A Specific Application

As a summary of the foregoing general principles of stores control, the actual stores routine of a large organization is now specifically cited. The succinct and clear statement by the Laclede-Christy Clay Products Company, St. Louis, Mo., of its stores method is likewise an admirable reminder of the need of an authoritative *written* formulation by each company of its material control routine. The stores control system must not abide in the consciousness and caprice of storekeepers and stock clerks. Written stores instructions should always be available.

The stores instructions of the Laclede-Christy Clay Products Company, to be quoted, came to hand when the pamphlet was about completed and it is rather interesting to note how closely the principles of the pamphlet and the actual practice of the company coincide, though the conclusions in each case were arrived at independently of the other. This correspondence indicates that while each firm will naturally modify the stores procedure set forth in the pamphlet so as to comply with its own requirement, the changes necessary may be slight and easily made.

STANDARD STORES PRACTICES

Issued by the Management

Laclede-Christy Clay Products Company, St. Louis, Mo.

GENERAL INSTRUCTIONS:

1. In order to prevent certain supplies being charged twice, everything purchased for construction, repairs or maintenance at the factories and mines, as well as regular stores items, will be charged through the stores account.
2. When and as it becomes necessary to order supplies, the Depart-

ment requiring same will fill out requisition, in triplicate, stating whether it is for stock or immediate use, where same is to be delivered, and by what date; also for what material is to be used and where. Quantity and *complete description should be given*, as well as a statement of stock on hand, and a record made as to the last date and quantity of material ordered. No such purchase requisition, except for stock, will be honored unless full description of use to be made is noted thereon.

3. Requisition is then signed; original and blue duplicate detached from Requisition Book, fastened together, forwarded to the Department Head for approval, then to Storekeeper, and sent by Storekeeper to the Purchasing Department. Prices are then secured and order placed—same being noted on both copies of requisition. Original copy is then placed in Purchasing Department's Unfilled Order File; blue duplicate, after insertion of charges, if a stores item, is forwarded to the General Storekeeper—Laclede Plant and handled as indicated in Paragraph No. 8.

4. In order to avoid incurring expense for rehandling, all such supplies delivered should, as heretofore, be accompanied by a dray slip furnishing information as to where it is to be delivered, but should go to such destination via Main Storekeeper or Branch Storekeeper.

5. *Dray ticket will, in all cases*, be signed by Branch Storekeeper or Storekeeper as the case might be, who forwards duplicate *immediately upon receipt*, to General Storekeeper who forwards same to Purchasing Department to be checked against the bills and passed to Accounting Department for Voucher. General Storekeeper must enter contents of all packages and loads:

- 1—On Stock Cards, or
- 2—In Book

6. When dray ticket does not list contents of package or load the number of the Purchase Requisition listing such contents must be entered on Dray Slip or the contents of such package or load must be indicated in some other way with sufficient clearness to allow the bill to be checked at the main office. Dray slip must be signed by the Branch Storekeeper, or Main Storekeeper as the case might be.

7. As Dray Tickets are received by the Purchasing Department, they are checked against the original requisition, material indicated as being received is noted on requisition and invoices are OK'd for payment and turned over to the Accounting Department to be Vouchered.

8. All blue slips covering stores items will be sent to General Storeroom and held there as a matter of record. All dray slips sent to General Storeroom from Branch Storerooms must have signed Stock Requisition attached whenever material is to be charged out of stores at one time.

9. In the case of material which is to be held in stores and given out a little at a time as needed, the dray ticket is sent to the Central Store room as described in Paragraphs 5 and 6 and the Stock Requisitions which are made out by the users whenever such stock is drawn from stores are sent to the General Storeroom and the Stores Statement is made up from them by the Cost Department in the usual manner.

10. In the case of supplies, such as sewer pipe, etc., taken from the yard stock, the foreman using same must enter the amount and purpose

for which it is used upon a Stock Requisition and send it to the General Storeroom. The General Storekeeper will save it with others, until the end of the month and then send it to the Cost Department where the cost accountant will price it and enter the total value of the Stores Statement opposite the proper job.

DEFINITIONS:

11. In order to avoid misunderstanding we would define **DIRECT MATERIAL** as those materials which are actually present in the finished product such as clay, grog, sand, etc.

12. The term **SUPPLIES** should be used to denote anything entering indirectly into the product—such as coal, oil, setting sand, waste, etc.

13. All purchases chargeable directly and at once to capital account such as horses, motor trucks, etc., should not be charged through stores. Brick, cement, etc., used for construction work and so ultimately entering capital account should be accounted for as directed in the fourth and ninth paragraphs.

14. The distribution of such miscellaneous charges as do not fall within the above classifications, such as express charges, etc., which should appear on the Stores Statement will be sufficiently indicated on the Vouchers to enable the Cost Department to enter the amounts on the Statement opposite the proper job.

BRANCH STOREROOMS:

The following shall be considered as Branch Storerooms, with the Laclede Storeroom as General Stores:

Christy Plant Stores (Green Req.)
 Machine Shop Stores (Yellow Req.)
 Mine Stores (Green Req.)

The Storekeeper and Branch Storekeepers shall be held responsible for the quantity and quality of all items received by them. However, in receiving such items as Castings for the Stoker Department, or Props for the Mines, and such other stores as might require *special inspection*, it is the duty of the Mines in the case of Props (for example) to pass upon the quality of the material received.

STORE ROOM INVENTORIES:

Instead of making a count of all supplies in the storeroom twice a year, which requires the services of several members of the office force at a time when they cannot easily be spared as well as the General Storekeeper, interfering with the proper discharge of his regular duty during that time, the Continuous Inventory System shall be followed.

Under this system the stock of each variety of supplies is counted when it is *low* and can be counted quickly. The result of the count is entered in red ink as shown on the Stores Card. Arrangements should be made to count every article in stock at least once in six months. This can be taken care of by the storekeeper running through his cards occasionally and noting what is still uncounted.

In order to provide for the frequent actual count of supplies on hand

at Christy Plant and for check against the stores cards in the General Storeroom, Stock Requisitions from the Christy Plant or from any of the other branch Storerooms not located at the Laclede Plant, shall contain the quantity of the supply ordered already on hand. The actual count so secured will then be checked against the Stores Record Cards at the General Storeroom and any errors rectified in the same manner as at the General Storeroom.

At least once a month the storeroom should be visited by some one acting in the capacity of auditor who will select a number of cards from the file at random and by count verify the quantities shown thereon.

This form of inventory record shall also be applied to the Rochester Plant.

STORES AT SUB STATIONS:

In order to prevent the needless loss of time on the part of employees in various departments caused by trips for supplies in small quantities and to reduce clerical work, in so far as possible, varieties of nails, nuts, bolts, etc., which are being used constantly shall be dealt out by kegs or by packages to the responsible heads of such departments, and charged out as "used" when given out.

AUTHORIZATION TO SIGN STOCK REQUISITIONS:

Stores should be issued only on Stock Requisitions signed by men designated on a written list signed by the Plant Superintendent and posted in the Storeroom and, except in case of emergency, stores will be issued, in so far as is practicable at stated hours designated by the Superintendent, in writing.

PRESERVATION OF CONTAINERS:

In order to preserve containers of various sorts, the Plant and Mine Superintendents shall post a notice similar to the following, on Form 21

(Standard Factory Instruction):

"All foremen are requested to assist the Storekeepers in securing the prompt return to the Storeroom, in good condition, for shipment to owners, the following:

- 1. Cloth bags, cement, clay or minerals
- 2. Oil and paint cans
- 3. Water carboys or bottles
- 4. Acid carboys
- 5. Acetylene and oxygen drums
- 6. Oil, iron drums and wooden barrels
- 7. Wooden boxes for window and plate glass

.....Supt."

STOCK REQUISITION:

All items removed from stores must be covered by stock requisitions. These requisitions shall give a brief description of the material taken from stores, the purpose for which it is to be used, the date, and such other items as called for on the form. No stores will be issued unless requisition is properly filled out.

In order to make sure that all supplies drawn from stores are properly charged, all Stock Requisitions for materials to be used on Repair and Construction Work should give a brief description of the work, together with the Account Number and Expense Order Number, as shown on the Expense Order. The account numbers on requisitions for supplies, not chargeable to any expense order, will be filled in by the Storekeeper. The account numbers as shown on the stock requisitions will be checked each day by the Despatch Office.

How Foremen and Workmen Can Assist

To a large degree the success of the stores control system will depend on the cooperation of foremen and workmen. Occasions will arise offering the greatest temptation to avoid established procedure of stores control and to resort to the old practice of helping one's self. The fact must be brought home that such overstepping of the regular procedure will inevitably lead to confusion and possibly to heavy money losses.

In particular the foreman can directly help the control of materials by avoiding congestion in the departments, by protecting material in the departments against breakages and theft, by assisting in the proper distribution of material to their men, by seeing that the men get the quantity of material ordered, by ascertaining that the correct number of finished pieces are produced from the quantity of material drawn or the equivalent in scrap presented, that material is skilfully handled in the departments and when processed that it is promptly and properly transferred.

The foreman can prevent the irregular accumulation of material in his department. Who does not know the factory with its miscellaneous material smuggled away in assembly rooms or containers, or strewn under work benches and around machines, and even thrown into waste cans, all of which unnecessarily increases the investment in inventories.

And the foreman can effectively cooperate by husbanding the consumption of those materials, the required amounts of which can only be estimated and not always expressed with exactitude. We have in mind factory supplies such as oil, waste, paint, greases and solder, and fittings and fastenings such as bolts, nuts, screws and rivets.

The little wastes, a nut here, a bolt there, inconsequential in themselves but serious in the aggregate, test the fibre of a plant, and the foreman must be trained to the importance of the

practical little economies. To promote a more careful use of supplies one firm offers prizes monthly to the foreman making the best record in the consumption of supplies per unit produced and the firm, moreover, posts the name of the foreman whose record is worst in this respect. The plan puts the foremen on their mettle and tends to eliminate waste.

The control of material does not end with the storeroom or its records; it is genuinely a factory problem requiring the hearty cooperation of the operating departments.

Conclusion

There has probably been more good work accomplished in the control of material than in any other phase of cost accounting, although the general criticism may be fairly made that there has been a tendency to call for excessive detail. The main function of a factory is to manufacture, to which all else must contribute. Be chary about adding detail or expense for the control of material, unless it can be definitely ascertained that this additional mechanism and outlay will be justified by resulting economies. A good suggestion is to consult your storekeeper about any change, since he has the responsibility of operation of the stores system and will be keen to detect that which is impractical.

Barring this caution against undue detail, the fact remains that an efficient stores or perpetual inventory system, and that alone, will provide for—

1. Sufficient material to meet production requirements so that production shall at least not be checked by a lack of necessary material.
2. A minimum investment in inventories, which is of importance.
3. An orderly and accessible arrangement of material and the physical safeguarding of material from the elements and theft.
4. The elimination of the burdensome and inaccurate annual physical inventory.
5. A monthly closing by giving the amount and value of material on hand at any time.
6. An invaluable record in case of fire loss.
7. A safeguard against the accumulation of obsolescent material.

The perpetual inventory will show the past and present consumption of material, and will allow for a revision of the quantities of material carried to comply with present market and production conditions, will indicate the items that are slow moving, over-stocked and non-standard. The perpetual inventory ties up here with the problem of standardization. In fact, a standardization policy cannot proceed far without the information and data supplied by the perpetual inventory system.

To those firms and organizations who are not satisfied that their material investment is at an efficient minimum, who suffer periodically from shortages of material, who are unable to make monthly profit and loss statements, who fret at the prospect of the annual physical inventory, who are not adequately conserving their material investment by giving it the best of physical care, to such the perpetual inventory is recommended.

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