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Operation of a standard cost system in a rubber footwear factory

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Boston University
THESIS

The Operation of a Standard Cost System
in a Rubber Footwear Factory

by

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The Operation of a Standard Cost System in a Rubber Footwear Factory

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Preface

The purpose of this thesis is to present, as clearly as possible, an accurate description of the procedure followed in the accounting and factory departments of a rubber footwear factory, during the assembling and use of standard cost data.

The subject of standard costs is not new. During the last decade much has been written about it: many books have been published, and the National Association of Cost Accountants has printed several hundred pamphlets on specific problems as interpreted by leading cost accountants.

Seldom, however, does one find a complete description of the accounts and methods used to apply standard costs to a particular business. It is my intention to fulfil that need. At times it will be possible to explain a point briefly, occasionally more detail will be necessary. Some forms will be illustrated in order that their use may be better understood.

I believe that, after careful reading, one will understand where the cost figures come from, who is responsible for them, and how they are finally assembled and put into form so they may be of use to the management.
Introduction.

Type of System to be used.

It may be stated, generally speaking, that there are two types of accounting systems in use in large industrial concerns today. One may be termed "actual costs" and the other "standard costs". In the actual costs the charges for material used in production are taken from the invoices received, the labor costs come from payroll records, and overhead costs are determined by light, power, and similar expenses as revealed by the records.

Standard costs go further into detail than actual costs. Not only do they tell what it actually costs to produce, but they also show what production should have cost under normal operating conditions. This added information is one of the real advantages, or values of standard costs. A definite goal is set up which should be met every month. The exact method of determining that goal will be described with much more detail later in this thesis.

Problems Peculiar to the Industry.

Many problems in the manufacture of rubber footwear make it difficult to determine operating expenses through the medium of standard costs. Probably one of the most troublesome lies in the vast number and variety of small
items that are manufactured. There are several distinct types of rubber footwear. They may be classed as "boots", "lumbermen", "heavy all-rubber gaiters", "rubber style gaiters", "cloth gaiters", "shoes", and "tennis" (canvas footwear). These in turn may be classified further.

"Boots" may be either "short", "storm king", "sporting", "low laced", or "plain overs" (for use with leather tops); "all rubber gaiters" may be "snap", "buckle", or "automatic fasteners"; "cloth gaiters" and "shoes" may be "light" or "heavy" construction, while "tennis" may be "oxfords", "bals" or "lace-to-toes". And then there will undoubtedly be several special customers, such as mail-order houses, chain, and department stores, whose orders must be made up and marked in a distinctive manner.

This classification gives an inkling of the variety of items which must be considered. Also, in addition, no mention has been made as yet of the fact that an article is being manufactured which, like leather shoes, must range in size from a child's "six" to a men's "twelve". Practically all numbers are made in half sizes, and as for the different styles of lasts, who knows how many types or varieties of heels are attached to women's shoes today?

Another factor which must be considered is the small unit cost per pair. It is true that costs are usually
built up on a 100 pair basis, but this does not alter the fact that many operations which go into the making of a shoe cost only a thousandth of a cent per pair. Still, these operations must be recorded in order that the proper departments will receive credit on the standard cost sheets.

There is another set of items which hamper not only this industry, but any that is highly seasonable. That is the relatively high cost of training new employees, the difficulty of many departments meeting overhead budgets during several months of the year, and the continued adjustments of plant personnel throughout the year.

In the rubber footwear industry there are two peaks during the year, one major and the other minor. The major peak is reached during the fall months, usually about November. The production of "boots", "lumbermen", "gaiters", and "shoes" is increased at a rapid rate after the month of July. By December these items, which have been made primarily for sale during the winter, must be in the hands of the dealers. There is, therefore, at this time a very sharp decrease in the production of these types of footwear. Many productive operators, as well as some supervisors, must be released. It is true that a small part of the productive personnel will be retained, because the production of tennis shoes will start to increase in January
and in February or March will probably reach its peak. Of course, "sneakers" must be in the dealer's hands by April or May at the latest.

A glance at a tennis shoe and at a boot, gaiter or shoe will disclose the reason why the peak of employment and productive value is attained during the fall months. The operations on footwear made at that time are far more expensive, materials cost more, and overhead costs are heavier.

The weather presents another problem in the costing of footwear and the volume of business. Many companies can work out fairly accurate sales quotas and thus have a definite basis on which to set a budget; but the rubber footwear business is dependent, to a large degree, on the weather. A long winter, with attendant snow and slush, is a boon to the industry, while an open winter has an adverse effect on sales. A heavy snowstorm before Christmas is of more sales value than several storms after Christmas. Also, a storm that covers the New York area is worth much more than several storms in states which are sparsely settled.

The Organization of Personnel

Regardless of how easy it appears, it is no simple problem to organize the personnel in a factory so that
maximum efficiency and co-operation may be obtained. The rubber footwear industry is no exception. Clearly defined lines of authority and responsibility must be made known to all in a supervisory role. This applies equally to the general manager as well as to the boss or foreman of a small department in the mill.

The first chart presented in the appendix shows a typical organization in a rubber footwear factory. Below is a brief explanation of the functions of the different men as they appear on the chart.

The president may be termed the general manager of the company. The vice-president in charge of production has four aides reporting to him. The first I have termed a production aide, for his sole responsibility deals with production problems. Reporting to him will be the superintendents of "Mixing and Compounding", "Calendering and Cutting", "Light Making", "Heavy Making" and the following non-productive department heads: "Technical aides", "Time and Motion Study", and "Industrial Relations". The "Factory Cost Estimating" and "Waste" departments may also come under the scope of the production aide.

The engineering aide has charge of all engineering and mechanical departments. His duties include oversight of: plant engineering, process and development engineering,
foundry, tinshop, carpenter shop, engraving, and drafting room.

The head of the raw material and purchasing department has been placed under the vice-president in charge of production, because the function of this department is tied up directly with production. Both current and future requirements of cotton and rubber depend on what is and what will be made.

The importance of research has not been fully recognized until of late. This work should be carried on under a separate head, and costs should be separated from regular production, for only by so doing can true costs of each be portrayed to the management. Research work should deal with any new projects which are undertaken to provide additional outlets for rubber products.

It may be possible that the work of the two departments just described is of such importance that they may report directly to the general manager.

The vice-president in charge of sales has several men reporting to him. They are the managers of: "Footwear Sales", "Special Sales", "Branch Sales", "Advertising", "Product", "Sales Research", and "Warehousing".

The third vice-president, sometimes called the comptroller, usually is the secretary and treasurer of the
company, and therefore he has charge of all finances. He controls the "Credit and Collection", "Treasury", "Accounting", and the "Budget" departments. The decision as to which accounting system will be used rests with him.

Having in the preceding pages suggested the organization necessary in the manufacture of rubber footwear, I shall next describe, briefly, how the footwear is made.
Rough Sketch of the Making of Rubber Footwear.

In order that the reader may be better acquainted with the subject, I shall now give a brief description of the products which are classed as rubber footwear. I shall also show the various processes used to manufacture the product.

There are two general groups: "canvas" footwear and "gum". By "canvas" is meant any type of shoe that has a canvas upper. These are commonly called "sneakers", but they are known in the trade as either "canvas" or "tennis". They are hereafter referred to as tennis shoes.

The other group, spoken of as "gum" above, covers a wide range of products: "shoes", (generally called rubbers) "rubber style gaiters", "cloth gaiters", "heavy all-rubber gaiters", "lumbermen", and "boots".

The main ingredients used in the manufacture of rubber footwear are: rubber, (usually spoken of as "gum"), chemical compounds, fabrics (mostly cotton goods), and findings.

There are, of course, many grades of rubber. The quality of the finished article naturally depends on the kind of rubber used. Since this is not a treatise on the chemistry of rubber I shall not go into details regarding the history of the raw materials. By "compounds" is meant
those chemical substances which are used to give rubber the proper qualities for wear, elasticity, and color. A few of the compounds used are: sulphur, litharge, whiting, zinc oxide, ochre, and lithopone. Fabrics consist of many styles and weights of "sheetings", "osnaburgs", "drills", "ducks", "nets", "cashmerettes", "fleeces", and other types of cloth. Findings, or extra materials, consist of laces, eyelets, wrapping paper, cartons, cases, buckles, clasps, raceways, snaps, buttons, and many other miscellaneous items.

The first major operations in the manufacture of rubber footwear are called "compounding, batching and mixing". "Compounding" is the weighing of the proper amounts of each compound, as previously determined by a formula prepared by the chemists, and marking these quantities with the number of the gum stock which is being prepared. These compounds are then placed together in a large metal container. This container goes to the batching room, where the correct amount of a certain grade of rubber is added to it. The mixture, or compound, is called a batch of stock, and varies in weight from 100 to 300 pounds. The container and contents are then put on a roller conveyor or trucked to the mixing room.

In the mixing room the compounds and rubber are mixed
on a "mill", which is a large machine with two rolls placed side by side but moving in opposite directions. The rolls are hollow and are kept at certain temperatures either by the use of steam or cold water. The rubber is placed on the mill and thoroughly warmed up, forming a sheet. Then the compounds are added and the whole mass is kept on the machine until the rubber and compounds are thoroughly mixed.

From the mixing room the batch of stock is sent to the calender room. A calender may be described generally as a large machine with three or more rolls held up on a frame and driven by gears. It is sufficient to say here that one kind of calender forms the rubber in thin sheets to be used for the upper part of a shoe or gaiter; another type of calender forms it in thicker sheets for the sole of a shoe; and still another model coats a layer of gum on the different fabrics used for linings, stays, and reinforcements.

This stock is then carried to the cutting room, the gum stock on an endless belt, and the fabric stocks in rolls, where it is stored until ready for consumption. After cutting, the parts may be taken directly to the making room, or if necessary they may go to a preparatory department where certain small parts may be joined together, or tennis
uppers may be stitched together.

In the making room the finished article will be assembled on an aluminum last. Lining, insoles, stays, reinforcements, outside gum parts, outsoles: all are combined by the proper operators, and the completed shoe is ready to be vulcanized.

Vulcanization is the curing of rubber by sulphur and heat. The boots, shoes, or gaiters are put into a huge vulcanizer, which looks like a boiler, the doors are closed and then live steam or hot air under pressure is turned on the shoes. This causes a welding together of all the parts of the shoe, and the finished article comes out as one piece.

After the shoes have been cured they are sent to the packing room. There they are trimmed, inspected and packed ready for shipment.

I believe the preceding paragraphs may serve to acquaint the reader with a better knowledge of how rubber footwear is made and thus enable him to picture more clearly the problems as we work on them from a cost angle.

Sequence of Operations. (Handling an order)

I want to present here a short description of the steps an order goes through between the time it is received and the time it is shipped.
It will be assumed that an order has been received for several hundred cases of boots, shoes, and gaiters. The order is acknowledged and sent to the ticket office, where production is scheduled. To simplify the illustration, it will be assumed that part of the order is for ten cases of Men's gum shoes, ranging in size from six to twelve. Ten cases are equal to two hundred forty pair, and this is only part of a day's work for one making conveyor. It is necessary, therefore, to group several orders, and these will be given a bracket number.

Henceforth throughout the mill, these shoes are identified by this bracket number. This number is assigned to a making conveyor on a certain date, allowing enough days to lapse so the preparatory work may be completed. All brackets for each making day are summarized and issued to department heads in a form called a "guide".

The scheduling department next orders the gum and fabric stocks required from the mixing department and the cloth storage section of the raw materials department. All this work is done, as I mentioned above, with reference to the making date. The calender department requires a certain weight of gum for the uppers, another gum for the outsoles, and other fabrics and gum for use as linings and reinforcing stays. The amounts of each are determined from standard
specifications which are set by the construction section of the ticket office.

Some parts may be cut the day before making, other parts must go to some preparatory department, as described previously, so they must be cut two or three days before making. All parts are segregated by their bracket numbers, so on the day of making, they are delivered to the conveyor that has been assigned to make that bracket of shoes.

After making, curing, and packing, the shoes are sent to the branch or jobber from which the order was received. When it is shipped a tag is sent to the billing department, and then the invoice is made out and sent to the customer. Of course, several copies of this invoice are made out, because various departments are interested in knowing when that particular order has been filled and shipped to the customer.

I trust this short description of how an order is handled may give a fair idea of the routine of an order through the factory.
Accounting for Costs via Standard Costs.

Advantage of Standard Costs.

In the introduction, one of the advantages of standard costs was stated to the effect that a definite goal is set. This, of course, implies that some sort of budget must be drawn up. While this is true, one may operate on a budget without the use of a standard cost system. However, the budget in this case must be determined wholly with reference to previous experience. It may be possible that the old records indicate the best results obtainable, but this is seldom true.

Standard costs, when properly set up, do provide, as I have mentioned previously, a definite goal which each department should meet. Variation from the standard is a true measure of the efficiency of the department. Individual months may show slight variations but over a period of a year standard and actual costs should be very close. It should be understood at this time that the standard is a reasonable goal that can be attained.

Setting the budget.

The determination of the yearly budget is one of the most difficult parts of a standard cost system. Budgets are usually set on a yearly basis and then the monthly figures are averaged.
The first thing to do is to set sales quotas. This is done by the manager of budgets. It consists of a careful study of merchandising trends, inventories of goods on hand, probable amount of business obtainable for the industry as a whole, how much each company may expect, and a general idea of how the total will be broken down by types. The sales budget should be approved by the sales manager, and will undoubtedly have been checked over with his assistants.

From the sales budget one can readily estimate production requirements. This information is valuable to the purchasing department in that it gives them an indication of how much rubber and fabric will be required. It is an aid to the engineer because it shows approximately how many pairs of shoes will be produced. The number of new machines required, present equipment that must be repaired, and engineering problems which new types of shoes bring up, may thus be anticipated.

Since the kind of shoes that are going to be made is known, generally speaking, one may now calculate the amount of labor and overhead necessary in each department to make the proposed production. The description as presented here-with is brief -- more detail will be added in a later section.

The direct labor and material costs may be obtained from the unit cost estimating department. They have in their
files a complete cost of every description of shoes manufactured in the plant. By the simple method of multiplying the number of pairs of the key shoes to be made in an average month by the unit cost in each department, one may readily ascertain the direct labor cost, by departments, for each month. Direct and extra materials are, of course, treated in the same manner. It should be understood that the figures are merely averages and may not represent any particular month, but they are a base from which to work.

If it is desired by the management department, costs of heavy goods may be segregated from light footwear, and canvas may be kept apart from the other two divisions.

As to what items should be called direct labor and which should be termed indirect, is another matter of policy. It is recognized that all operations that can be measured as applying to every pair of shoes of the particular type taking the operation, should be costed as direct labor. The more direct the charges to a shoe, the less that will have to be applied as indirect and overhead costs, and it follows that the cost will be much more accurate.

Whether or not setups and roll changes should be charged to direct labor is another mooted question. Several writers believe that it should be included as a part of the
direct labor cost. But if it is known that the cost of setups is approximately 10% of direct operating time, does it matter if the total direct labor is said to be 110% of net direct labor (operating time) or if the cost of running a yard is stated as 100% to which must be added 10% for setups?

The budget department has standards for indirect work in all departments in the factory. By indirect work is meant operations that may be measured to a certain degree, but cannot be allocated to particular shoes. Probably as good an example as any would be trucking. The length of time taken to push a truck a certain distance can be determined readily, but the number of pair of shoes transported will vary, depending on productive capacity. Over a period of time, however, the ratio of indirect labor costs to direct labor can be determined quite accurately.

Much time could be taken here explaining in detail how overhead budgets are set. Each account could be described and the method of estimating just what is a fair budget figure at a given production, could be elaborated on at some length. Since more detail will be given later, one or two simple illustrations will be presented at this time.

The item of power and light is a familiar name among the overhead accounts. There are various meters throughout
the plant, so we know, from past experience, that it takes a given amount of power to turn out so much stock from which 10,000 pairs of shoes may be made. By a system of weighing the values we can arrive at the power required to manufacture the different types of footwear. Since we have an estimated production of shoes for a monthly period it is a comparatively simple matter to obtain power requirements and cost this at the anticipated rate for the year.

Another factor entering into overhead accounts is the amount that is fixed and the amount that is variable. This is important at the end of the month insofar as it can be used to explain variances in costs due to volume. More about variances will be discussed later.

By fixed amounts we mean that this allowance will not vary as production varies. In the case of electric power, for example, if there is a minimum charge per month, that would be fixed. The balance, depending on Kilowatt hours used, would be variable. In the Steam account, it is probably necessary to have engineers in the boiler room all the time, regardless of the capacity of plant production. This cost would be fixed. Of course, many accounts are entirely variable with production, direct labor is probably the best example.

One more simple illustration of how the insurance account
might be set up. The cost of insurance depends on the number of men employed, which in turn depends on the production. From the production requirements the number of employees for each department may be readily determined. The premium rate per man is set up in a table, so the calculation of budgeted overhead is simple.

All overhead accounts for each department are calculated in a similar manner. Past records are of value, but they must be seasoned with judgment, because the old costs may not have been up to standard. It is usually a good idea to talk over the proposed budget with the foreman of the department. There may be a few debatable figures, but these can be straightened out to the satisfaction of all.

After budgets have been made out for all producing departments, the non-producing or service department budgets are made up. These are often set up first, because in most instances the costs of these service departments are prorated over the departments which they serve.

Still other budgets which must be set are waste, administrative, and commercial expense budgets. The best man to determine the waste budget is undoubtedly the one who has charge of the material control section. This is a rather difficult problem, but is very important.

Administrative and commercial budgets are determined
by the manager of budgets. While these may depend somewhat on production in the factory, yet they are in reality somewhat removed from the activity there. It is rather essential that a selling organization be maintained, whether the factory is producing 80,000 or 20,000 units a day.

It is quite necessary that the budget be flexible. By this is meant that a change in construction of shoes would warrant a correction of direct labor and some overhead accounts. The budgets must be made up and so constructed that this change may be made without disrupting the cost and accounting organization. Speaking of such an incident may seem unnecessary, but it is a real factor that is often disregarded. Again, if a certain department fails to meet the budget or certain accounts for several months, a careful check may disclose that a new development has taken place which was not considered when the budget was set. Naturally, the correct thing to do is to revise the budget.

This has been mentioned before, but it may be emphasized now that after a departmental budget has been set, it is good psychology to have the head of the department approve his own budget. He will then be much more willing to cooperate and try to meet the budget figures that he approved.

After all the departmental budgets are approved, it
is necessary to make a composite or master budget. All the direct labor items are grouped to get one grand total. The same procedure applies to all the items in the budget. The resulting budget shows the total costs expected for the month and year. From the sales forecast and factory and commercial budgets, the comptroller and manager of budgets can draw up a "pro forma" balance sheet and profit and loss statement for the ensuing year. These sheets are checked over with the president and his immediate aides. It may be necessary to decrease certain expense accounts in order that an operating profit may safely be earned. Such a procedure is of real value to any concern, but, of course, it does not insure profits. No accounting system can do that, although it does point out the way. If the sales department can really sell the amount of its budgeted quota, if each factory department keeps costs within its budget, and the commercial department keeps within its budget, then there will be a certainty of income exceeding expenses for the year.

The preceding pages have briefly suggested some of the problems of costing rubber footwear, explained how rubber footwear is made, and mentioned how budgets are determined. The next section will deal with the classification of accounts.
Classification of General Ledger Accounts.

In order that the reader may get a complete picture of the cost system I am describing in the rubber footwear industry, I shall show here the classification of general ledger accounts as recommended by the Rubber Manufacturers Association. (1)

   11. Cash
      13.1 Notes, Loans and Acceptances Receivable - Customers.
      .2 Notes, Loans and Acceptances Receivable - Employees.
      .3 Notes, Loans and Acceptances Receivable - Others.
   14. Accounts Receivable
      14.1 Accounts Receivable - Customers
      .2 Accounts Receivable - Suspended Accounts.
      .3 Accounts Receivable - Employees.
      .4 Accounts Receivable - Others.
      .01 Reserve for Cash Discounts.
      .02 Reserve for Volume Rebates.

(1) Uniform Accounting Manual - The Rubber Manufacturers Association 12/1/33 "General Ledger Account Classification, page 1 et. seq."
.03 Reserve for Freight Allowance.
.04 Reserve for Bad Debts.
.05 Reserve for Adjustments.
.06 Reserve for Allowances.
.07 Reserve for Price Decline Rebates.
.08 Reserve for Foreign Advertising.

15. Accrued Assets Receivable.

      21.1 Finished Goods on Hand
      .2 Transportation on Finished Goods on Hand
         (or consigned) at Branches.
   22. Factory Ledger Control (Goods in Process)
   23. Materials and Supplies.
   24. Materials and Supplies in Transit.

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      31.1 Land
         31.11 Land
            .12 Cost of Acquisition of Land
         .2 Land Appurtenances
         .3 Buildings
         .4 Machinery and Equipment
         .5 Molds, Cores and Poles
6 Liners and Wraps
7 Small Tools
8 Furniture and Fixtures.
9 Automobiles and Automobile Trucks.
02 Reserve for Depreciation - Land Appurtenances.
03 Reserve for Depreciation - Buildings.
04 Reserve for Depreciation - Machinery and Equipment.
05 Reserve for Depreciation - Molds, Cores and Poles.
08 Reserve for Depreciation - Furniture and Fixtures.
09 Reserve for Depreciation - Automobiles and Automobile Trucks.

33. Real Estate (Other than business property)
   33.1 Real Estate (other than business property)
      .01 Reserve for Depreciation.
34. Stocks and Bonds of Subsidiary Companies
35. Sinking Funds, Securities, Mortgage Loans.
   35.1 Sinking Funds
      .2 Securities of Outside Companies
      .3 Mortgage Loans
4. Prepaid, Deferred and Miscellaneous Assets.
   41. Salary and Wage Advances
   42. Prepaid Insurance
   43. Freight and Express (Inbound - clearing account)
   44. Prepaid State and County Property Taxes.
   45. Prepaid Interest on Bank Loans (or discount)
   46. Improvements to Leaseholds.
   47. Prepaid Expenses - Miscellaneous
      47.1 Prepaid Bond Discount and Expense.
      47.2 Prepaid Commercial Agency Subscriptions.
      47.3 Prepaid Rent
      47.4 Experiments and Developments.
      47.5 Suspended Charges - Allied Companies.
      47.6 Insurance Adjustments
      47.7 Prepaid Advertising
      47.8 Miscellaneous Prepaid Items.

5. Good-Will, Patents and Trade Marks.

   61. Notes, Loans and Acceptances Payable.
   62. Accounts Payable
      62.1 Accounts Payable - Outside Vendors.
      62.2 Accounts Payable - Unclaimed Wages, etc.
      62.3 Excise Tax Payable on Sales.
      62.4 Claims Payable
.5 Unaudited Invoices
.6 Unrendered Invoices.
.7 Contract Estimates Payable
.8 Accounts Payable - Employees
.9 Accounts Payable - Miscellaneous

63. Accrued Payroll
64. Dividends Payable
65. Accounts Payable - Subsidiary Companies.
   (This account applies only to subsidiary companies
    which are consolidated in company records)
66. Accrued Taxes
67. Accrued Interest
68. Accrued Liabilities-Miscellaneous

7. Fixed Liabilities, Capital Stock, and Surplus
71. Funded Debt
72. Capital Stock
   72.1 Capital Stock - Preferred
    .2 Capital Stock - Common
73. General Reserves
79. Surplus
   79.1 Earned Surplus
    .2 Capital Surplus

8. Income and Expense on Sales.
81. Sales
81.1 Sales (Own products)
   .2 Sales (Outside products)
   .01 Returned Goods

82. Deductions from Sales

82.1 Allowances
   .2 Adjustment Losses
   .3 Excise and Sales Taxes
   .4 Rebates
   82.41 Volume Rebates
   .42 Price Decline Rebates
   .5 Transportation
   .6 Cash Discount on Sales
   .7 Obsolete Finished Goods Losses.
   .8 Royalties (Assessed on a sales basis)
   .9 Allowances for Factory Shipments to
      Customer.
   .10 Gain or Loss on Foreign Exchange

83. Cost of Sales

83.1 Cost of Sales (own products).
   .2 Cost of Sales (outside products).

84. Factory, Warehouse and Shipping Expense.

84.1 Factory Warehouse Expense
   .2 Factory Shipping Expense

85. Selling Expense (Control)
Selling Expense consisting of expenses similar to those indicated below, shall be analyzed departmentally.

Salaries.

85.10 Salaries - Executive
.11 Salaries - Department Managers and Assistants
.12 Salaries - Branch Managers and Assistants
.13 Salaries - Salesmen
.14 Commission - Salesmen
.15 Commission - Agents
.16 Commission - Brokers
.17 Training Expense - Salesmen
.18 Salaries - Adjustors
.19 Salaries - Office Managers
.20 Salaries - Credits and Collections
.21 Salaries - Stenographers
.22 Salaries - Clerical
.23 Salaries - Chauffers and Drivers

Traveling Expense

85.24 Traveling Expense - Executives
.25 Traveling Expense - Salesmen
.26 Entertainment Expense
Rental Expense

<table>
<thead>
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<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>85.27</td>
<td>Rent</td>
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<tr>
<td>.28</td>
<td>Losses on Leases</td>
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<tr>
<td>.29</td>
<td>Maintenance and Repairs to Buildings</td>
</tr>
<tr>
<td>.30</td>
<td>Taxes on Buildings</td>
</tr>
<tr>
<td>.31</td>
<td>Insurance on Buildings</td>
</tr>
<tr>
<td>.32</td>
<td>Depreciation on Buildings</td>
</tr>
<tr>
<td>.33</td>
<td>Heat, Light, Power and Water</td>
</tr>
</tbody>
</table>

Depot Expense

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>85.35</td>
<td>Depot Expense</td>
</tr>
</tbody>
</table>

Branch Warehouse and Shipping Expense

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>85.36</td>
<td>Salaries - Stock Clerks</td>
</tr>
<tr>
<td>.37</td>
<td>Packing and Shipping Labor</td>
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<tr>
<td>.38</td>
<td>Packing and Shipping Supplies</td>
</tr>
<tr>
<td>.39</td>
<td>Stock Handling Expense</td>
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<td>.40</td>
<td>Taxes on Stock</td>
</tr>
<tr>
<td>.41</td>
<td>Insurance on Stock</td>
</tr>
<tr>
<td>.42</td>
<td>Outside Storage Space (other than depots)</td>
</tr>
<tr>
<td>.43</td>
<td>Cartage and Trucking</td>
</tr>
<tr>
<td>.44</td>
<td>Automobile and Automobile Truck Maintenance</td>
</tr>
<tr>
<td>.45</td>
<td>Gasoline and Oil</td>
</tr>
<tr>
<td>.46</td>
<td>Tires and Accessories</td>
</tr>
<tr>
<td>.47</td>
<td>Depreciation, Automobiles and Trucks.</td>
</tr>
</tbody>
</table>
.48 Miscellaneous Automobile Expense
Office and Miscellaneous Expense.
85.54 Samples
.55 Losses on Finished Goods
.56 Postage - General
.57 Employment Expense
.58 Employees' Compensation Insurance
.59 Premiums on Surety Bonds.
.60 Stationery and Office Supplies
.61 Telephone and Telegraph
.64 Furniture, Fixtures and Equipment Expense
.65 Freight and Express.
.67 Truck Tire Applying
.68 Mileage Contract Expense
.69 Credit and Collection Expense
.70 Books and Periodicals
.71 Dues and Donations
.72 Sales Service Expense.
.73 Provision for Pensions.
.74 Miscellaneous - Unclassified.

Bad Debts.
85.75 Provision for Bad Debts

Advertising
85.76 Salaries - Advertising Manager and
Assistants.

85.77 Advertising Expenses.

86. Administrative Expense (Control)

Administrative Salaries

86.10 Salaries - Executives

.11 Salaries - Department Managers and Assistants.

.19 Salaries - Office Managers

.21 Salaries - Stenographers

.22 Salaries - Clerical - General

.23 Salaries - Chauffers and Drivers

Traveling Expense - Administrative

86.24 Traveling Expense

.25 Entertainment Expense

Rental Expense

86.27 Rent

.29 Maintenance and Repairs to Buildings

.30 Taxes on Buildings

.31 Insurance on Buildings

.32 Depreciation on Buildings

.33 Heat, Light, Power and Water

Automobile Expense

86.44 Automobile and Automobile Truck Maintenance
.45 Gasoline and Oil
.46 Tire and Accessories
.47 Depreciation - Automobiles and Trucks
.48 Miscellaneous Automobiles Expense

Office and Miscellaneous Expense

86.56 Postage - General
.57 Employment Expense
.58 Employees' Compensation Insurance
.59 Premiums on Surety Bonds
.60 Stationery and Office Supplies
.61 Telephone and Telegraph
.62 Tabulating Machines - Rental and Supplies.
.63 House Organ Expense
.64 Furniture, Fixtures and Equipment Expense.
.70 Books and Periodicals.
.71 Dues and Donations
.73 Provision for Pensions
.74 Miscellaneous - Unclassified

86.78 Legal Expense
.79 Directors' Fees and Expenses
.80 Conventions and Conferences
.81 Patent Expense
.82 Auditing
.83 Taxes.


91. Income Credits

91.1 Real Estate Income and Expense

.2 Cash Discount on Purchases

.3 Purchase Commission

.4 Dividend Received

.5 Gain or Loss on Foreign Exchange (Resulting from conversion of foreign currency for balance sheet purposes only.)

.6 Sinking Fund Income

.7 Interest Credits

.8 Royalties Received.

.9 Miscellaneous Income Credits.

92. Income Debits.

92.1 Interest Debits

.2 Interest Debits (Allied Companies)

.3 Interest on Bonded Debt

.4 Discount and Expense on Bonds and Notes.

.5 Extraordinary Expenses (other than property)

.6 Property Expenses (Extraordinary)

.7 Extraordinary Experiments and Developments.

.8 Miscellaneous Income Debits.
93. Provision for Income Tax (Federal)

99. Profit and Loss

Factory Ledger Accounts.

While I am giving account classifications I shall show the factory ledger accounts as suggested by the Rubber Manufacturers Association. (1)

Direct Material

Crude Rubber
Reclaimed Rubber
Other Compounding Materials
Textiles

Processing Costs

Wash, Dry and Masticate Department
Compounding Department
Carbon Black Department
Mixing and Milling Department
Cement Department
Spreading Department
Calendering Department (Including take-off)
(Above departments include all labor and overhead costs)

Purchasing
Raw Materials - Handling and Storage

Freight
Cotton Tax (If any)
Extra Material (recommended to be included in Direct Material)
  Binding
  Buckles
  Buttons
  Cartons
  Cases and Containers
  Eyelets
  Fasteners
  Laces
  Leather Tops
  Paper
  Rivets
  Sealing Tape
  Tags
  Tape
  Thread
Direct Labor (Departments)
  Cutting
  Stitching
  Preparatory
  Making
Molding
Vulcanizing
Packing

Overhead

Expense Materials, Supplies and Miscellaneous

Office and Stationery Supplies
Printers' Shop Supplies
Operating Supplies
Cafeteria Supplies
Mechanical Supplies
Packing and Shipping Supplies
Garage Supplies
Coal and Fuel Oil
Lubricants
Instrument Repair Parts and Supplies
Miscellaneous Tools
Liners and Wrappers
Purchased Power
Rental of Equipment
Unabsorbed Freight
Demurrage
Donations and Subscriptions
Books and Periodicals
Telegraph and Telephone
Association Dues,
Licenses, Autos, Drivers, Engineers and Elevators
Traveling Expenses
Provision for Pensions
Miscellaneous

Indirect Labor
Supervision Salaries
  Executives
  Superintendents
  Division Foremen
  Foremen and Sub-Foremen

Office and Clerical
  Clerks
  Paymasters
  Timekeepers
  Draftsmen
  Stenographers
  Messengers

Indirect Salaries and Wages
  General
    Watchmen
    Sweepers and Cleaners
    Inspectors
    Elevator Operators
Truckers
Scrap Collectors and Sorters
Cleaners and Oilers
Weighers and Checkers
Taking Inventory
Repairing Slight Defects

Allowances
Instruction and Learning
Time Allowed
Overtime Allowance
Minimum Wage Allowance

Idle Time
Waiting Time
No Material
Poor Material
Improper Routing of Material
Machine Breakdown
No Power
No Work
Accident

Education
Athletics
Sickness

Molds, Liners and Air Bags
Changing Molds
Cleaning Molds, Cores, Poles and Rings
Liners Labor

Power Labor
Firemen
Engineers
Coal Passers
Unloading Coal
Sub-Station Attendants
Switchboard Operators
Meter Men

Welfare
Factory Council Salaries
Health Salaries
Cafeteria Labor

Technical
Chemists and Assistants
Testers
Experimental and Development Shops, Garage and Yard
Shops Labor
Tool Crib Attendants
Cutting Dies Labor
Garage Labor
Yardmen
Snow and Ice Removal

Stores and Packing
Stores Handlers
Packers and Shippers
Repack Goods

Repairs and Maintenance
Land Improvements
Buildings
Machinery and Equipment
Molds, Cores and Poles
Liners and Wrappers
Small Tools
Furniture and Fixtures
Autos and Auto Trucks

Depreciation
Land Improvements
Buildings
Machinery and Equipment
Molds, Cores and Poles
Liners and Wrappers
Small Tools
Furniture and Fixtures
Autos and Trucks
Insurance

Compensation and Liability

Fire

Fidelity Bond

Tornado

Use and Occupancy

Payroll Robbery

Boiler Explosion

Plant Explosion

Riot and Civil Commotion

Elevator

Automobile

Taxes

Land and Buildings

Personal Property

Control Accounts.

General Ledger Control Account

Direct Material in Process Control Accounts

(sub-divided if desired by divisional controls)

Direct Labor in Process Control Accounts

(sub-divided if desired by departmental controls)

Overhead in Process Control Accounts

(sub-divided as required under productive departments or overhead centers)
Waste Control Accounts

(sub-divided as required under productive departments)

Royalties Accounts (assessed on a Production Basis)

(sub-divided departmentally as required)

Cost of Receiving and Handling Materials.

Repair Orders in Process.

Construction Orders in Process

Salvage Material Account

Stores

Cafeteria Inventory

Items in Suspense

Deferred Charges to Operations

Petty Cash Fund

Non-Productive Departmental Overhead Accounts

Factory Management Department

Industrial Relations

   Employment Department

   Medical Department

   Welfare Department

   Police Department

   Fire Department

   Safety and Sanitation Department

   Cafeteria Department
Power

Boiler Plant Department
Electrical Generation Department
Electrical Transmission Department
Compressed Air Department
Hydraulic Power Department
High Pressure Service Water Department
Low Pressure Service Water Department
Gas Department
Drinking Water System Department

Laboratory and Development

General Research Laboratories
Chemical Testing Department
Physical Testing Department
Fabric Testing Department
Experimental and Development Department

Technical Service Department
Specification Department

Transportation and Service

Garage Department
Central Trucking Department
General Yards Department

Shop Departments
Mold and Core Department
Machine Shop and Maintenance Department
Tool Room Department
Electrical Maintenance Department
Drafting Department

Clerical

Timekeeping Department
Payroll Department
Cost Department (including Engineering Costs and Property Records)
Factory Accounting Department
Time Study Department
Production Planning Department
Scheduling Department

Finished Product

Shipping Department
Finished Goods Warehouse Department

General Factory Expense

(Expense general to all departments)
Accounting for Material

Functions of accounts (actual)

I am going to present the functions of some of the more important accounts used in the rubber footwear manufacturing industry. These descriptions will be brief, and, of course, refer to factory ledger accounts of actual costs.

Crude Rubber. This account is debited with the cost of crude rubber purchased. No freight, insurance, or commissions, will be charged to this account, the cost being New York crude only. The correlative credit will be General Ledger. (G/L Accounts Payable.) At the end of the month the account will be closed, the debit being to Manufacturing Account. Accumulative purchases for the year are reflected, and it does not include opening inventory or consumption.

Reclaimed Rubber. Debited with the cost of reclaimed rubber manufactured by the Reclaim Department, at Standard Costs, the correlative credit being to an offset account (which will be distributed at closing.) The credit with the balance at closing is debited to Manufacturing Account. It reflects the accumulative production of reclaimed rubber at standard costs.

Other Compounding Materials. Debited with the cost
of compound materials, including freight, the credit being to General Ledger (G/L Accounts Payable.) The balance is closed into Manufacturing Account at closing. It reflects accumulative purchases for the year.

Textiles. Debited with the cost of fabrics including all finishing charges. The credits and closing is the same as the other material accounts.

Costs of Receiving and Handling Materials. This account may have some other caption, but it should include all costs, labor and overhead, relating to the following departments, or accounts: purchasing, raw materials - handling and storage, freight and cotton tax (if any).

Processing. This account should include all calendering (including take-off).

The above accounts are additions to Direct Material costs and will be handled similarly to the material accounts at the close of the month.

There will be other miscellaneous material accounts depending on the size of the plant, but they are relatively unimportant so I shall not discuss them.

Accounting for Extra Material

Functions of Accounts.

There should be no necessity for describing in detail
the function of each account, since it will be similar for all. Accounts will be set up for binding, buckles, buttons, cartons, case and container, eyelets, fasteners, laces, leather tops, paper, rivets, sealing tape, tags, tape, thread and other miscellaneous items.

These accounts will be debited with the cost of these items purchased for the manufacture of finished goods. The correlative credit will be to General Ledger (G/L Accounts Payable.) It is credited with the balance at closing, the correlative debit being to Manufacturing Account.

There are other accounts which might be classed as extra material, or even direct material, which will be handled the same as the preceding accounts. The number of such accounts will depend on the size of the firm, and might include such accounts as: tool crib stock, mechanical stock, carton and fibre board shooks, leather tops, barrels-drums-reels, foundry (Merchandise only) and printing (merchandise only.)

Accounting for Labor

Functions of Accounts.

Direct Labor. This account will be debited with the cost of all direct labor expended in various production, processing and service departments throughout the plant
according to payroll classification, correlative credit being to General Ledger (G/L Account Wages Payroll.) At closing the correlative debit to the credit will be to Manufacturing Account. The actual payroll of direct labor employees is reflected in the account, and it will be subdivided under the various departments in the factory.

Indirect Labor. This account will be debited with the cost of all indirect labor, other than salaries, expended in the various producing, processing and service departments throughout the plant according to payroll classification, the correlative credit being to General Ledger (General Ledger Account Wages Payable.)

Direct Labor Excess, Indirect Labor - Salaries, Direct Labor Transfer, Indirect Labor Transfer and Indirect Labor - Salaries Transfer are all labor accounts which are handled the same as the above two accounts.

It should be understood that all of these accounts have numbers and that they will be grouped. The material accounts might have numbers beginning with 100, the labor accounts might have numbers starting with 200, the waste accounts might be the 300 numbers, the overhead might be the 400 and 500 numbers. A certain group might be offset accounts and another might be used for the various distribution accounts.
Accounting for Shop Overhead.

Functions of Accounts

Salaries - Supervision. Debit with the salaries paid to managers or supervisors, not including clerks in the various factory departments, other than indirect labor salaries paid in producing or processing departments, the correlative credit being to General Ledger (G/L Account Wages Payable.) Credit with the balance at closing, the correlative debit being to Manufacturing Account. It reflects the supervision salaries paid in non-producing or processing departments.

Stationery and Office Supplies. Debit with the cost of office supplies used throughout the various factory departments, the correlative credit being to a miscellaneous materials Offset. Credit with the balance at closing, the correlative debit being to Manufacturing Account. The account reflects the consumption for the period, charged departmentally.

Telephone and Telegraph. Debit with the cost of all telephone and telegraph service charged direct to the Communication Department, the correlative credit being to General Ledger (G/L Accounts Payable.) Credit with the balance at closing, the correlative debit being to
Manufacturing Account.

I do not believe there is any necessity of continuing on with the various overhead accounts. The procedure is the same and the functions of the accounts will be similar. A complete list of the overhead accounts will be found in the preceding chapter.
How standard costs per unit are built up.

In one of the earlier chapters I mentioned very briefly how standard costs were set up. However, to really understand how standard costs operate, I believe that a detailed description of the various elements and how they are accumulated will be necessary.

Before I start to analyze the operations of the cost findings department, I would call the attention of the reader to two things. The first is that standard costs are used for operating purposes. In a sense they are a thing apart from actual costs. Variances should be traced to the factory, not to the cost or accounting departments. The second is the fact that standard costs can and should be used in the establishment of selling prices. Actual costs should never be used, because in times of depression when actual costs are excessive due to overhead, the selling price would be set too high. At normal production (from 60% to 70% of plant capacity) is the proper basis on which to set costs.

In connection with this last thought I am going to set forth here the cost accounting formula for the calculation of rubber product costs for establishment of selling prices as recommended by the general accounting committee of the Rubber Manufacturers Association. (1)

(1) Uniform Accounting Manual - The Rubber Manufacturers Association, December 1, 1933
Cost Elements (in summary form)

Factory Cost

1. Material
2. Direct Material
3. Extra Material
4. Waste
5. Direct Labor
6. Factory Overhead
7. Expense Material, Supplies and Miscellaneous
8. Indirect Labor and Salaries
9. Repairs and Maintenance
10. Depreciation
11. Insurance
12. Taxes
13. Power
14. Royalties (assessed on machines or production basis)
15. Mold Depreciation
16. Air Bag Cost (Tires only)
17. Total Factory Cost (or Cost of Sales)

Commercial Expense

18. Factory Warehouse and Shipping
19. Transportation (outward freight, rail and truck, express, parcel post)
20. Deductions from Sales
21. Allowances
22. Adjustment Losses
23. Obsolete Finished Goods Losses
24. Excise and Sales Taxes
25. Volume Rebates
26. Allowance for Factory Shipment to Customers
27. Royalties (Assessed on Sales basis)
28. Cash Discount
29. Selling Expenses
30. Branch Selling Expense
31. Branch Operating Expense
32. Home Office Selling Expense
33. Home Office Operating Expense
34. Advertising
35. Bad Debt Losses
36. Administrative Expense
37. Total Commercial Expense
38. Total Cost
39. Profit Mark-Up
40. Selling Price

Direct Material Standards.

In the costing of rubber footwear it is the usual practice to keep factory costs separate as between waterproof footwear and canvas footwear. To obtain costs of material, it is necessary to adopt certain sizes which will
be average, and the Rubber Manufacturers Association recommends the following (1):

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<thead>
<tr>
<th></th>
<th>Waterproof</th>
<th>Canvas</th>
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</thead>
<tbody>
<tr>
<td>Mens'</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Boys'</td>
<td>5</td>
<td>4\frac{1}{2}</td>
</tr>
<tr>
<td>Youths'</td>
<td>1</td>
<td>13\frac{1}{2}</td>
</tr>
<tr>
<td>Women's</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Misses</td>
<td>1</td>
<td>13\frac{1}{2}</td>
</tr>
<tr>
<td>Child's and Little Gents'</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

Direct materials should include all fabric and gum in a finished article packed and ready for shipment to a warehouse. For control purposes, extra material will usually be kept separate from the fabric and gum costs.

In the appendix will be found a sample of a specification sheet as well as forms used by the Cost Department of the Hood Rubber Company.

The specification sheet forms the basis for costing. It shows the part, the stock number, the die number for cutting and the size used. It also lists the extra materials, tells the cements and varnishes and their gravities, the vulcanizing cure and any special packing or making instructions. These specifications are issued for every type of shoe made, and are authorized by the management department. Any change in construction calls for a new

(1) Uniform Accounting Manual - The Rubber Manufacturers Association - December 1, 1933.
Let us follow the costing of a typical shoe through the cost department. I shall not bother with actual figures but merely illustrate principle.

The first part called for on a specification is usually the lining. It calls for a certain stock, which is the identification for a certain kind of net, fleece or any other type of fabric, which has been spread with cement, or coated with gum (rubber). How much we are going to use, and the cost, will be determined by the die number and the cost per unit of measurement.

The area of the pattern has been previously determined by the area control department. These men have found that from each die the cutter will obtain a definite number of cuts per yard or per block. This figure has been recorded in the form of square feet required per 100 pair of shoes. The factor is also used by the stock ordering and waste departments, the man who has charge of checking areas also having charge of the waste department.

Since we now have the number of square feet needed per 100 pair, it is necessary to know how much the prepared stock costs. From the stock book we can find just how the stock is made up and can price the fabric on a yard basis, obtain the amount of gum required, and cement, if any, and
and then add to get a completed cost per yard. If the scrap has any salvage value, this will be deducted to get a net cost per yard, and we can easily arrive at the cost per square foot. The prices of fabric and gum, with the breakdown of the gum price into rubber, reclaim, compounds, mixing and warehousing will come from schedules prepared by the accounting and compound cost departments. It should also be mentioned here that the factor, or square feet required per 100 pair, does include the natural waste which is inevitable due to the contour of the pattern which is being cut.

When we have figured the cost per square foot and found how many square feet are necessary per 100 pair, it is a simple matter to multiply and get the standard cost per 100 pair for this part of the shoe. All fabric parts (really prepared stocks) are treated the same, the breakdown as shown on the cost sheet is for control purposes and is merely a mathematical calculation.

The cost of gum parts is determined on a weight basis, and it is the net weight of the part going into the shoe. Accurate costs are determined by checking the weight of a part cut from the gauge of gum required, using the die called for on the specification. Weights of parts cut from plain sheet gum may be approximated by formula if the
area of the die is known, but gum parts cut from engraved rolls cannot readily be estimated. However, records of such rolls can be kept as checked, so only new rolls will have to be actually weighed. It should be understood here that scrap gum or rubber stocks can usually be reworked with only the loss of calendering labor and overhead, which loss is prorated over the good parts cut.

To the cost of fabric and gum parts in the shoe we must add any cement and varnish that will be used in the making and finishing of the shoe. This figure may be arrived at on an area basis and quite accurately by the different types of shoes. The cost of cement and varnish includes material and all labor and overhead charges necessary to make it usable in the finished product.

The extra material costs can be readily obtained from the schedules of prices and the requirements of parts as shown by the specification. Costs of extra material should include all warehousing and similar charges together with any losses due to scrapping or spoilage. Prices will be supplied by the accounting department to the cost department.

Calendering costs, labor and overhead, must be added to other direct material costs to arrive at a total material cost. By calendering we mean that rubber is
applied to the surface of a fabric by a coating or frictioning operation, or that rubber is sheeted out through rolls to a certain gauge (thickness.)

Direct labor costs are determined from standards set by the time and motion study (standards) department. By standard here, I mean the length of time it takes to do certain operations. This may be expressed in any of several ways, depending on the system of wage payment in use in the factory. This standard may be the total time per yard or it may be the value of physical effort made per yard. These standards costed at the base rates of the crew attending the calender will result in a cost per yard of stock. The calender crew will consist of a calender man, one or more mill men and helpers as required by the different types of calenders.

Some fabric stocks may be calendered with more than one coat of gum. A schedule of costs at the various calenders can be made up and then costs for the different stocks determined. Some fabric stocks are also spread with cement. This is similar to a calender operation and is sometimes classed as part of the calender department. The spreading is usually done near where the cement is mixed and several hundred feet from the factory buildings, due to the fact that the materials used (naphtha, benzine,
etc.) are highly combustible.

After the direct labor per yard has been found, one can readily convert that to a cost per square foot. It will be noted that several stocks will have the same cost per square foot. These can all be grouped together and for purposes of convenience a code letter can be assigned to each stock so the factors for each group can be added together and one extension made to arrive at the direct labor for that group.

Costs of calendering gum stocks are figured alike. The basis of measurement may be a yard, a frame, a sheet or a reel, but if necessary it can all be converted to yards easy enough. Standards per yard will be checked against the base rates and the cost per unit determined.

One other direct cost in the calender room is that of cracking stock. All gum stock, as it comes from the mixing department, is in the form of a slab about 24 x 30 inches and about one-half or three quarters of an inch thick. These cannot be put directly on warming mills, but they must be masticated into a thinner piece and broken down some. The cracker machine does this by means of two corrugated rolls. The cost here depends entirely on the weight of the gum going through, therefore costs are set up on a pound basis.
The application of overhead to unit standard costs in the calendar room presents quite a problem. Overhead in the past has been distributed on a direct labor dollar basis. The Uniform Accounting Manual (1) advocates a machine hour rate for the following reasons:

1. Calender equipment is of different design, size and speed, therefore production per average hour varies according to the calender on which the work is done.

2. A different number of men are required to operate different calenders, depending on the operation which is being performed, and these man-hours have no relation to the elapsed calender hours.

3. Stock runs are of differing size and consequently the length of run has a direct bearing on the machine hour requirements, since change-over time is greatly diminished by long runs.

4. Hourly costs for depreciation, power, repairs, taxes and insurance vary according to the value or type of equipment, power required to operate it and the expenditure necessary to maintain it.

If it is possible to set up machine hour rates without too much expense, the resulting accuracy in allocation of overhead to the unit costs will probably be worth the extra

(1) Uniform Accounting Manual - The Rubber Manufacturers Association December 1, 1933
effort.

The overhead rates to be used will be predetermined by the accounting department and sent to the cost department along with the other overhead schedules to be applied to the unit costs. These overhead schedules are made up new each year and may be revised if there is a change in rates during the year. I have spoken about the flexibility of these budgets before. Just how these are made up will be explained in more detail later.

Assuming that we will have a machine hour overhead rate for the calender room, at the same time we are determining direct labor, we shall find the time it takes to run a yard of stock. Thus it may happen that two fabric stocks may take the same direct labor (on an effort basis) but one stock may run twice as fast as the other, in which case a different overhead should be applied.

It will be noted on the unit cost sheet in the appendix that the calender department has been split into five sections. They are:

F - Fabric
S - Spreader
P - Plain Sheet (including all engraved uppers)
O - Outsole
C - Cracker
To this group should also be added plain sheet apron and outsole apron. These are take-off operations which are classed as part of calender costs per the Rubber Manufacturers Association.

When the total calender and take-off cost has been calculated, it is transferred to the direct material sheet and appears as an added element of cost. This, together with warehousing and any other element which might not be included in the fabric or gum price (such as purchasing or mixing and milling) is all added together to obtain a total standard unit cost of material per 100 pairs of shoes.

Direct Labor Standards.

Direct labor should include all labor operations that can be costed directly to a shoe. These operations are usually standardized on a per pair basis, but at times some other unit of measurement may be required.

All direct labor costs should come from standard letters which the time study department has issued. These standards will have to be costed at the prevailing rate as set by the person who does that. Each job has a particular rate, and that rate will be used in standard costs. If a foreman uses a man on a job paying lower than the operator's regular wage there will be an overrun in standard costs.
In the cutting department, cutting instructions are all outlined on the specification sheet. For cost purposes it may be well to separate the cutting into two or three sub-divisions, such as: Fabric cutting, gum cutting and outsole cutting. The larger the plant, the more desirable the division.

On the cost sheet as shown in the appendix it will be noted that fabric cutting has even been broken down so that standards for jobs taking the same base rate can be accumulated. The same holds true of gum and outsole cutting.

The stitching department is not difficult to cost because the standards department usually sets standards by shoes. That is, all the operations for a single shoe are listed on one sheet. After costing those and extending the correct direct labor per shoe can readily be ascertained.

The preparatory department is sometimes called the fitting department. Miscellaneous work is done here, such as: cementing linings, stitching linings, cementing cloth parts, making up vamp, quarters, joining small parts preparatory to making, attaching buckles or buttons and studs, or building up small parts complete so they may be attached in the making room as one piece. The standards
department usually makes out lists of operations that apply to like groups of shoes or gaiters, then codes them so they may be readily used.

The making department is not difficult to cost. Standards are set by shoes, usually a group standard is set. It is necessary to determine the number of operators, their base rates, and apply the standards and costs accordingly. If there are several methods of making the same shoe, one method should be decided upon by management as being the approved standard, and standard costs set on that method. A variance in standard costs might mean that another more expensive method was used to make the shoes.

In the vulcanizing department it will be necessary to find just what operations the shoe goes through. A bright finish shoe must be varnished before vulcanizing. After curing the shoes are stripped from the lasts and trucked to the packing room.

The packing department is the last real producing department. Here the shoes are trimmed, inspected and mated, wrapped and packed, and cased and sealed ready for shipment. Standards here are usually set for each shoe, but casing and similar operations usually have only one or two standards depending on whether there are to be 12 or 24 pairs per case.
It should be remembered here that there will be different material labor and overhead costs for each type of shoe even between men's and boys'. The number of standards applicable to the costing of one shoe probably runs into the thousands (from the time the rubber and fabric comes in until it goes out in the form of a finished shoe.)

**Application of overhead to unit standard costs.**

There is not much to be said regarding the application of overhead costs to unit standard costs. The accounting department supplies the cost department with the scheduled budget for each department. These schedules show the ratio between direct dollars and overhead dollars. So-called indirect costs are included in overhead and the ratio or percentage of direct as shown is applied to the unit costs. Where costs have been broken down or sub-divided in a department, as I explained in the cutting room, a separate overhead rate may be applied to each, after which both direct and overhead may be totaled and transferred to the cutting department section on the departmental sheet.

Exceptions to this method of distributing overhead might be found in the molding department, press room and in the vulcanizing department. These sections may have a machine or heater hour rate, if so a schedule of same will
be supplied by the accounting department. As for the vulcanizing department it may be easier to have a fixed rate depending on the class of shoe and also a variable rate, varying directly with the direct labor. This method is probably easier and in the long run may be just as accurate as a heater hour method of distributing the overhead charges.

Waste as a part of unit standard costs.

When I was talking about material costs I said that natural cutting waste was classed as part of direct material costs. That is true, but in addition to natural waste on fabric stocks we often have parts returned that are scrapped for some reason or other. Perhaps the cutting department did not use the right die, possibly the calender department did not use the right coating gum, possibly the preparatory or making department made a mistake. This defective piece is called defective waste and is charged to the department at fault.

I also mentioned that gum scrap was usually reworkable. That is also true, but occasionally stock gets burnt on the mill, or is so lumpy that it cannot be used. Scrap of this nature is condemned stock and a loss must be taken.

There is also another type of loss occurring in rubber footwear manufacture and that is the loss incurred in the
sale of a pair of seconds below the list price of firsts, and also the loss incurred when poor goods are returned by the wearers and a new pair is sent to replace the returned merchandise.

These three types of losses should be included in factory cost so the accounting department will prepare a schedule showing their relation to total material cost, to total gum cost or to list value.

With the addition of the elements of direct material, extra material, direct labor, shop overhead, and waste losses, we get a total factory cost, which will be the total standard cost for the type of shoe which we have costed.
Building standard overhead budgets.

During a previous section of this thesis the subject of overhead budgets was brought up and a simple illustration was given to make a point clear in the mind of the reader. This section will go into more detail and will show how several accounts are set up, how fixed and variable is determined and how machine hour rates or production center rates are determined.

I have shown previously the method of arriving at budgeted departmental direct labor. This direct labor is the key or foundation of all expense accounts within a department, due to the fact that it brings out the percentage of capacity at which each department will operate during the ensuing year.

On strictly variable accounts one can determine the amount that should be budgeted for in relationship to the amount of direct labor to be expended. By strictly variable is meant those expenses which from past performance have been proven to fluctuate in direct proportion to the direct labor spent.

From schedules of insurance, taxes and depreciation it is known just how much is to be absorbed by each department, regardless of the percentage of capacity that the department may operate at. These expenses may be
termed as fixed charges and a budget is set up to take this condition into consideration.

These are other accounts which may also be said to be fixed, due to the fact that the management has deemed it advisable to spend a certain amount of money in their operation. These accounts cover the distribution of management departments such as: employment, technical service, purchasing, accounting, industrial relations, time study and standards. These departments are distributed to operating departments on a predetermined schedule and the amounts will remain constant throughout the year.

There are still further accounts which due to their nature are partially fixed and partially variable. Under this heading might be grouped such accounts as:

Industrial Trucking
Electric Power
Steam
Maintenance Expense

These accounts represent the distribution of departments which in turn include certain fixed charges, such as power demand, plant depreciation and insurance on boilers and plant.

Let us take the account for industrial trucking.
Working back we find that it includes several items: the labor cost of operating the electric trucks and elevators, a maintenance charge for the elevators and trucks and depreciation charges on both items.

The method generally used in the calculation of what part of such an account is fixed and what part of such account is variable is to plot a graph from past experiences. If we have determined that during the ensuing year the plant will operate at 65% of capacity, we can go back to the records and find just how costs in these accounts ran at, let us say, times when the plant was operating at 40%, 65% and 85% of capacity. After plotting several points on the scale or graph, the amount of fixed expenses can be approximated very closely.

When this percentage of fixed charges in these mixed accounts has been determined, then we can arrive at a percentage of variable expense to direct labor.

At the end of the month in order to arrive at the budget adjusted to actual production, apply this variable percentage to the standard direct labor, thereby arriving at the adjusted variable expense. It is obvious that the fixed charges, or those charges which were considered fixed
should be added to this total, the result being a total departmental expense which would represent the budget adjusted to the actual production going through the department.

It may readily be seen that the difference between standard cost, which represents the amount of expense absorbed in the units produced at a given rate per unit, and the adjusted budget which includes the total fixed charges, will give the over-absorbed or under-absorbed amount of fixed charges, which we have termed previously as being volume variance.

In the previous section, on setting direct labor standards, I mentioned that the calender room was set up so that costs were applied to machines or production centers. Some reasons for the use of such rates have also been given as recommended by the Rubber Manufacturers Association.

I am going to suggest that rather than having a machine hour rate for each machine, that it would be far more simple and easy to operate if the machines were grouped according to the type of work they turn out.

Machine hour rates, as discussed briefly previously, will be explained in more detail at this time. Procedure may vary slightly from that suggested in the Uniform
Accounting Manual but results should be the same.

A standard machine hour rate is the cost per hour for indirect and shop overhead expenses appliable to certain machines doing similar work. This rate is applied to the time taken by direct operations which pass through this cost center. The theory is that indirect and shop overhead costs accrue to the product in direct relation to the time taken while being processed. Thus it is of basic importance that time be considered both in costing the product and checking actual operating results with standard and budget allowances.

The calender department lends itself readily to five cost centers. Four may be termed producing: the fabric calenders, plain sheet and upper calenders, outsole calenders and spreader machines. The fifth is really a service center through which gum stocks pass before going to the producing center. I have termed this center as cracking, and it will include all costs of storage and handling of gum stocks until they are delivered to the respective machines for processing.

From the standard ticket can be determined the actual yardage of stocks required, including standard allowances for overrunning, odd ticket and overlisting. By working these figures back to the speed of the machines one can
determine the number of direct labor hours which must be worked in order to turn out the standard production.

These figures can be determined by the different cost centers, with the exception that cracker costs depend on the weight of gum stocks cracked. The weights are readily obtainable from the estimated monthly requirements of gum, this net figure of gum into the product being increased to allow for scrap which will be re-worked back into the product. All costs of storing mixed rubber stocks in the calender room should be charged to cracker overhead.

As I mentioned before, the building up of overhead budgets on a machine hour basis is fairly simple. Of course one can readily apportion fixed charges, such as depreciation of machines, to a particular section. Those overhead accounts which contain mixed elements will be determined as explained above. If one knows how many hours the sections will need to operate to turn out the ticket, it is a simple matter to estimate overhead expenses required for that time.

The application of the machine hour rates to standard costs is not difficult. It will be necessary to make several budgets, in a sense, out of the one as set for control purposes, because in two or three sections, the
various machines may have several speeds. Different stocks and rolls will run at varying speeds, and naturally the overhead cost of a stock travelling through a machine at 20 yards a minute should not bear as much overhead as a stock which can only be run at 8 yards a minute.

In order to properly set correct rates for the varying speeds, it will be necessary to check the accounts rather closely. The power consumption, for example, should be checked by obtaining the amount of power needed at the various speeds, and a graph made to plot and fill in any speeds that are missing. Maintenance expenses, lubrication, water, and steam should all be checked with records. In some cases it may be necessary to use engineer's estimates.

This feature of costing accurately at various speeds is one of the arguments for the use of machine hour rate, so time spent in arriving at accurate figures is well worth the effort.

Once the overhead rates are settled, schedules can be drawn up for costs at these various centers and speeds, and these applied to standard costs according to specifications.
Methods of Overhead distribution.

Method of prorating non-productive departments and general factory expenses to productive departments.

It is an axiom of manufacturing that all costs in a factory are incurred solely, in the end, for the producing departments. Therefore, after all costs have been distributed during the month to either producing or non-producing departments, then the costs of the non-producing or service departments must be prorated over the producing departments.

The Uniform Accounting Manual of the Rubber Manufacturers Association lists seven different bases which should be used to prorate the general factory overhead: (1)

Basis 1 - Meter readings or engineer's estimates.
Basis 2 - Ratio of number of employees, total labor hours, or total labor dollars.
Basis 3 - Direct charges to productive departments
Basis 4 - Relative floor space area (Excepting power division).
Basis 5 - Additions to cost of material or supplies.
Basis 6 - Specific application to repair or new work orders.

Basis 7 - Charges to general ledger control.

Basis No. 1 - Meter readings or engineers' estimates. The following departments should be handled on this basis:

Steam generation department
Electrical generation department
Electrical transmission department
Compressed air department
Hydraulic power department
High pressure service water department
Low pressure service water department
Gas department
Drinking water system department

Insofar as possible separate meters should be installed so each department will be charged equitably. The plant engineer can estimate those departments having no meter.

In the case of all non-producing departments, they should be treated as though they were services which were bought outside, and so should include all material, labor and overhead costs.

Basis No. 2 - Ratio of number of employees, total labor hours or total labor dollars in all departments.

Any general expenses which have a bearing in relation to the number of employees, hours worked, or dollars earned, should be prorated on that basis. The following departments
are good examples:

- Factory managers department
- Employment department
- Medical department
- Welfare department (including employees' life insurance)
- Police department (other than watchman)
- Safety and sanitation department (applying to factory only)
- Timekeeping department
- Payroll department
- General factory expenses
  - Donations and subscriptions
  - Books and periodicals
  - Factory council salaries
  - Cost of drinking water.

Basis No. 3 - Direct charges to productive departments.

There are certain non-productive departments that are continually performing a service for certain productive departments. I mean that it is fairly easy for the foreman or manager of this service department to estimate very accurately which departments he has benefitted and to what degree. The following departments will come under this classification:

- General research laboratories
Chemical testing department
Physical testing department
Experimental and development
Technical service
Specification department
Garage department
Central trucking department
General Yard department
Drafting department
Taking inventory
* Cost department
* Factory accounting department
* Time Study department
* Production planning department
* Scheduling department
* Basis No. 2 may be used.

Basis No. 4 - Relative floor space area.

There are certain expenses which are incurred by service departments in direct ratio to the amount of floor space the producing department uses, and expenses should be prorated on that basis. The following departments are good examples:

   Fire department
   General factory expense
Watchmen
Sweepers and cleaners
Elevator operators
Snow and ice removal
Repairs and maintenance - Land improvements
(except power plant)
Repairs and maintenance - Buildings and building equipment (except power plant)
Depreciation - Land improvements (except power plant)
Depreciation - Buildings and building equipment (except power plant)
Fire insurance - Buildings (except power plant)
Tornado insurance
Use and occupancy insurance
Plant explosion insurance (except boiler explosion)
Riot and civil commotion insurance
Elevator insurance
Taxes on building and building equipment
(except power plant)
Cost of electric lighting (general plant only)

Basis No. 5 - Addition to cost of material or supplies.
I have mentioned before those departments which should be included in material cost.

Purchasing department
Receiving department
Stores department

Basis No. 6 - Specific application to repair or new work orders.

Mechanical Shops Overhead should be departmentalized according to the needs of each company. One account would do for a small company, a large one might want the following splitup:

Mold and core department
Machine shop
Carpenter shop
Tool room
Electricians

Work out of these departments may be charged out on a job order system using a total cost per hour for labor and overhead. Any variance in these departments at the end of the month would be charged to a variance account and closed into a cost of sales account.

Basis No. 7 - Charges to general ledger control.

The following departments should be charged to general ledger control and be taken up as a commercial
expense.

Shipping department

Finished goods warehouse department.
Monthly Reports.

At the end of the month it is necessary to close the books and make up reports to be sent to foremen and to management. There are four different reports which should be made up. They are:

1. Unit production (by divisions).
2. List value production (by division).
3. Summary of standard and actual costs.
4. Departmental cost reports.

The unit production report should show comparisons by types of shoes, of the total pairs produced during the current month compared with the same month last year. It should also show cumulative figures for the year to date compared with those of last year. This report is valuable also in that besides showing comparisons of pairs, it also gives opportunity for comparing percentages of "firsts", "seconds" and "worthless".

The list value production is about the same as the preceding report just described, the only difference being that the pairs have been transposed to selling price value. When reading this report, one should remember that in comparing like periods to consider changes in selling price.

Information from which the two reports mentioned above
are made out comes from the packing room reports of goods received.

An explanation is needed to show how the cost figures are determined for the other reports.

At the end of each month, production by pairs, is listed on a cost summary form. This is listed showing each item manufactured by descriptions. In order to keep costs separate by divisions (waterproof and canvas), a separate form should be made out for each division. This cost form allows a column for each producing department or cost center through which the shoe or product passes. Columns are also included for material costs, broken down between rubber, reclaim, compounds, textiles, extra material, calender direct and calender overhead (by sections if a machine hour or production center rate is used for overhead.) In departments where overhead is applied on a labor dollar basis, it will be necessary to include direct labor only.

The use of punched cards and a tabulating system may be used to avoid much clerical effort in the extending of these sheets.

The unit cost as entered on the sheets will be the latest cost, therefore the departmental report will be a true measure of factory efficiency. It will show what the
production should cost under current production conditions and eliminates outside factors pertaining to administrative or selling conditions.

When the forms have all been costed they must be extended, that is production multiplied by unit cost. This can be done cumulatively by departments, and the total will represent the total direct labor (or rubber, reclaim etc.) for the month.

Standard overhead is arrived at by applying the overhead or burden percentage of standard direct labor, excepting in the calender room, where overhead may be applied on a basis of machine hours or production centers. The standard overhead appliable to the product and the labor is determined at the time of setting the operating budgets. How these are set has been covered in a preceding section.

After these details have been summarized by divisions, a recapitulation is made and then one has the standard production costs for the month. From this recapitulation the entry is made transferring standard costs of goods produced to the Finished Goods Inventory Account.

This cost summary is put on a cost form called "A summary of standard and actual costs", listing in detail the operating summary of each department, showing standard costs, actual costs, and adjusted budget. (Samples of all
these reports to which I am referring in this chapter will be found in the appendix.)

The difference between budget and standard represents the volume variance, and the difference between budget and actual represents operating variance. The sum of these two variances will be equal to the total variance, which may also be found by deducting the standard cost from the actual.

This cost form also includes comparisons of actual and standard costs of materials, extra materials, and waste. Actual costs of all these items, including labor and overhead, come, of course, from the books.

The last report, referred to previously is the departmental cost reports. These are of vital importance to the foremen in the mill because they indicate how efficiently he is operating his department.

Direct labor costs have already been arrived at on the cost forms. It is then necessary to take this standard cost of each department and apply to it in detail, the budgeted allowances, thereby arriving at the standard allowance for each expense within any department. In comparison with the standard allowances on accounts is applied the actual performance by accounts for each department. By subtracting the standard from the actual will be found the total variance by accounts.
Operating losses are shown in red ink and efficiency gains are shown in black ink, the theory being that the operating gains are the least important in a factory, and that more is made by eliminating the waste. Red figures attract the attention of the foreman or divisional manager much more readily than black.

It will be noted that this departmental report does not show an analysis of variances, that is whether they are volume or efficiency variances. Expenses are grouped in such a manner on the report that those fixed charges and the variances in which the foreman would have no control may be easily separated from the remainder of the expenses by which the foreman's efficiency may be judged.

Copies of all reports should be sent to all of the management group. The foreman of each department should receive only his own departmental cost report. That is primarily all he is vitally interested in.

Mr. G. Charter Harrison, one of the leading exponents of standard costs, has made a list of the main causes of cost variations. These variations have been adapted from standard costs of grey iron castings to rubber footwear. (1)

1. Calendar variations

Variations in cost owing to the difference between the

actual production of shoes and the standard production of shoes divided as follows:

2. Variations between actual gum and fabric used and that necessary to realize standard production according to standard specifications.

3. Variations from standard overruns.

4. Variations from standard weights of parts.

5. Variations from standard defective scrap losses.

Variations in rubber batches, divided as to

6. Variations from standard formulas.

7. Variations due to the use of transferred materials

Variations in the consumption of miscellaneous materials

8. Compounds and acids.

9. Extra materials

Variations between actual and market price of:

10. Gum and fabrics.

11. Compounds and acids.


Labor variations:

13. In hours.

Salary variations:

15. In staff.

Power variations:

17. In consumption.
18. In the price of power.
19. Variations in miscellaneous operating expenses.

A few words of explanation may be in order at this time to explain some of the statements above.

Calendar variations mean that the number of working days in a month will often vary from the average. Naturally, in a short month fixed expenses will not all be absorbed and there will be a volume variance.

A difference between the amount of actual gum used and the standard as called for on the specification will of course cause a variance. Possibly the calender coated a fabric with 12 gauges of gum and the standard called for only 10 gauges. Or it might happen that in a run of outsole stock, the stock actually run was 10 gauges heavier than the specification sheet called for.

Standard overruns are allowances made for normal amounts of stock which must be calendered in excess of the actual stock ordered. If the stock is particularly bad,
due to lumps and other technical reasons, the actual overrun may be much higher than the excess.

Variations from standard weights might be due to the fact that a manufacturer of fabric, bought on a pound basis, may have sent in a lot of fabric which weighs over the standard set.

In a rubber footwear factory there are found many variances from standard material costs due to different gums being used in place of that called for on the specification. Chemists are continually trying sample gums which may cost more than the gum the replace. Another instance might be in the substitution of a more expensive gum for a cheaper one. This may be due to the fact that certain types of shoes have gone off the ticket and are not being made. In order to work off the surplus scrap that has accumulated, the factory may get a special dispensation to use the gum up in place of another of cheaper grade.

Another possibility for material overruns is an error in the mixing of certain formulas. The weather may have an effect, and often does, especially in the summer, of the amount of naphtha used in the mixing of cements.

With regard to extra materials, of course any excess loss or wastage above the normal allowance will cause a
variance.

Labor variations have been classed as being due to rates or to hours. These are really self explanatory. If a foreman in the mill uses a man at 47 cents per hour to do some operations that a girl at 39 cents should be doing, regardless of the reason for so doing, then there will be a variation in his standard costs at the end of the month. Or if it takes a group of operators one hour to do a job which, according to standard should be completed in fifty minutes, then of course a labor overrun will result.

Variations in salary accounts may be an additional supervisor that was taken on either permanently or temporarily. Then we also have the fact that men on salary do occasionally receive an increase in their salary, which may not have been considered when the budgeted expenses were being determined.

If there is an overrun in the direct labor account it is quite often true that overhead accounts which vary directly with labor will also reflect an increased cost over standard. For example, if a calender machine is operated 10% longer than the standard calls for, not only will there be an increase in labor but power, steam, water, lubrication, maintenance and indirect labor costs will probably show an overrun.
It is obvious that in manufacturing departments, no matter how much work is done in order that budgets may be set properly, there will be variances from standard shown on the cost sheets. Just as long as we have human beings operating in the department, errors are bound to creep in. Unforeseen contingencies will arise which necessitate increased costs above normal or standard.

The analysis of these variances should be one of the most important parts of the work of the cost man. It is his function to tell what happened that caused the variance, the foreman must be held to explain why he had the overrun, assuming it was an excess cost. It is management's function to see that operating conditions, including equipment, are the best possible in order that the departments in the factory may be able to keep operating variances at a minimum. Volume variance is, of course, another opportunity for management to know how the sales are running and to apply proper correctives in case they are in a lethargic condition.

In other words, the cost man through the use of standard costs makes a diagnosis of the conditions, and it is up to management to act on the situations as they see fit.
Summary and Conclusion.

In conclusion, I should like to summarize briefly just what has been accomplished in the thesis.

The introduction pointed out the two types of systems in general used in the rubber footwear manufacturing industry. The many problems were discussed and difficulties of operating a standard cost system were shown.

How rubber footwear is made was the next topic discussed. The many distinctive types of product were brought out and the route of an order for one of these types was carefully followed.

A short sketch of how the budget is set, was then presented, describing the setting of sales quotas, from which we arrived at production requirements and then made up budgets for each department.

After we had the budget set we showed how actual costs are kept. Account classifications in both the general and factory ledger were shown in detail and the functions of several of the more important accounts were analyzed.

The building up of unit standard costs was carefully pointed out in the next section. The importance of the direct labor costs was emphasized, as these are the key to the standard cost system.
Overhead schedules were checked and their construction determined. These are also very important and so merit careful consideration of the budget setter.

The last, but not the least, item which was discussed was that of reports and the analysis of variances. The detailed procedure of how the reports are made up was described and then causes of variances were pointed out. The analysis of these variances is probably one of the most constructive features of a standard cost system. Properly carried out, their value to management cannot be over-estimated.

In my opinion, standard costs can and should be of immense value in the efficient operation of a rubber footwear factory. I believe that the reader will agree that, once in operation, they are almost as simple to maintain as actual costs.

One of the biggest problems is to obtain cooperation throughout the organization and to sell them on the idea of standard costs. Once everybody is satisfied that standard costs are the right thing to have, and confidence in them is attained, then a real working spirit or moral will be in evidence throughout the plant.

Once the spirit of cooperation gets under way it will be noticed in costs. The foremen will be building up a
morale among the workers that will have a real effect on the monthly departmental cost sheets, and in the final analysis, profits are made and lost at the bench as any successful management knows.
Appendix

and

Bibliography
Chart of Organization

President and General Manager

Vice-President in Charge of Manufacturing

Production Aide
  Mixing and Compounding
  Calendering and Cutting
  Light Making
  Heavy Making
  Industrial Relations

Technical Aide
  Time and Motion Study

Engineering Aide
  Process Engineering
  Plant Engineering
    Machine Shop
    Foundry and Tinshop
    Carpenters and Electricians
  Drafting and Engraving
  Maintenance

Purchasing Manager
  Textiles
  Rubber
  Extra Material
Mechanical Goods

Development

Vice President in Charge of Sales

Footwear Sales

Special Sales

Branch Sales

Advertising

Product Manager

Sales Research

Warehousing

Vice President - Secretary - Treasurer

Assistant Treasurer

Credit and Collections

Accounting

Budgets

Payroll

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**Division AH**
- Boots
- Lumbermen
- A.R. Heavy Arctics
- Molded Boots

**Total Division AH**

**Division AL**
- Cloth Heavy Arctics & Gaiters
- Cloth Light
- Rubber Style Gaiters - Ankle
- " " Regular
- Shoes - Light Ankle
- " " Regular
- " Heavy

**Total Division AL**

**Division B**
- Regular Tennis
- Xtralocks
- Treads
- Molded Sandals
- Stitched Sandals

**Total Division B**

**Total Footwear**

**Division HM**
- Hard Rubber Boots
- Covers
- Dixies
- Gaskets
- Venits
- Miscellaneous

**Total Division HM**

**Division HO**
- Hard Rubber Boxes

**Division HP**
- Composition Boxes

**Division J**
- Tiling
- Square Feet
- Linoleum Feet

**Total Division J**

**Division O**
- Miscellaneous

**Division TV**
- Weavap

**Division TG**
- Garments

**Division TC**
- Curnets
- Colored Blankets
- Ankle Blankets
- Netting

**Total Division TC**

**Division TL**
- Crepe Looms

**Division TM**
- Miscellaneous

**Total**
- All Divisions
## HOOD RUBBER CO., Inc.
### SUMMARY OF STANDARD AND ACTUAL COSTS

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| TOTAL EXTRA MATERIAL |           |                                      |        |                |                     |
| DEPT'L. COSTS       |           |                                      |        |                |                     |

| TOTAL DEPT'L. COST  |           |                                      |        |                |                     |
| WASTE:              |           |                                      |        |                |                     |

| TOTAL WASTE         |           |                                      |        |                |                     |

| TOTAL COST          |           |                                      |        |                |                     |
| RUBBER PRICE        |           |                                      |        |                |                     |

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### DEPARTMENTAL COST REPORT

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Bibliography

As I mentioned in the preface, not much has been written regarding the application of standard costs to specific industries. The following books and pamphlets, however, might be considered as having formed the basis on which the thesis was written.

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September 15, 1933

Isaacson, L. E.
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N. A. C. A. Yearbook
1928, pp 313-316

Williams, Charles A.
Some Practical Aspects of Standard Costs
N. A. C. A. Yearbook
1927, pp 142-150
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Operation of a standard cost system in a rubber footwear factory