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Ronald J. Lewis

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Physical distribution, a neglected corporate step-child in the past, has come of age in many companies. But accounting has lagged behind in isolating and identifying the costs associated with P.D. functions—

ACCOUNTING GEARED TO PHYSICAL DISTRIBUTION'S THIRD GENERATION

by Ronald J. Lewis

Tri-State College

AWARENESS of the physical distribution total cost concept among U.S. industries has grown rapidly during the last decade. Responsive management has stimulated technological advancements which have reduced operating costs substantially. To make the technological advancements contribute fully in reducing costs, it has also been necessary to initiate organizational modifications of lines of authority. Organizational rearrangement has been directed toward placing more physical distribution functions under the jurisdiction of a single executive, "the physical distribution director."

What has taken place in the accounting systems of those companies that have made organizational changes? Have modifications in the system of accounts been made to reflect the application of the total cost concept in physical distribution? Based on the widespread in-

terest in the subject of distribution cost accounting in recent years, there is evidence of a lag in the modification of accounting systems to accompany organizational changes.

One of the main concerns of physical distribution managers has been the inability of the internal system of accounts to isolate costs related to their functions. And this weakness is perhaps the principal reason that internal control systems do not provide precise information for P.D. decision making. Since many accountants are involved primarily with financial accounting they may not have become acquainted with the relatively new "physical distribution" concept and its accounting implications.

The purpose of this article is to identify the physical distribution functions for the accountant and to present a system of accounts which encompasses these functions.

The system of accounts presented is not a complete chart of accounts, but merely that segment which pertains to the relevant functions. It is not intended to be universally applicable since there is a diversity of organizational patterns and accounting systems among companies. It does suggest, however, that these functions might be identified within an existing system of accounts. The system then may be modified to enable reporting of the appropriate charges in the company's internal reporting system.

In a speech before a national group of physical distribution managers, Wendell M. Stewart described three generations of physical distribution management.¹ The three generations show the level of

¹ Stewart, Wendell M., "P-D Revisited," speech reprint. Annual Meeting of Physical Distribution Management, October, 1969, New York City.

EXHIBIT I

	<u>Line Responsibilities</u>	<u>Staff Responsibilities</u>
First Generation <u>P.D. Management</u>	Shipping and Receiving Traffic (common carriers) Transportation (Private Fleet) Plant Warehousing	Traffic Research
Second Generation <u>P.D. Management</u>	Shipping and Receiving Traffic Transportation Plant Warehousing Field Warehousing Protective Packaging Order Processing and Communications Inventory Control (Allocation)	Traffic Research Materials Handling Engineering Customer Sales and Service Distribution System Design
Third Generation <u>P.D. Management</u>	Order Processing and Communications Shipping and Receiving Traffic Transportation Plant Warehousing Field Warehousing Protective Packaging Inventory Control	Traffic Research Materials Handling Engineering Customer Sales and Service Distribution System Design Distribution Cost Analysis and Control Distribution and Operations Planning Systems and Procedures Operational Forecasting Inventory Planning Production Planning Procurement Planning

sophistication in accepting and implementing the physical distribution concept in the line and staff responsibilities assigned to P.D. managers. The three stages are presented in Exhibit 1, above, as they were described by Mr. Stewart.

It is the third generation toward which many progressive companies are directing their attention. Mr. Stewart's lists, Exhibit 1, distinguish between line and staff responsibilities.



RONALD J. LEWIS is president of the board of directors and acting chief executive of Michiana College of Commerce, South Bend, Ind. He is also a professor and dean in the school of business of Tri-State College, Angola, Ind. Dr.

Lewis has taught at Northern Michigan University in Marquette and Hartwick College in Oneonta, N.Y. Previously he was a budget analyst and administrative cost analyst with the Ford Motor Company, Dearborn, Mich., and a senior sales representative with Burroughs Corporation, Detroit.

ties. He does not say that all companies will achieve the third level of sophistication nor that the third generation is desirable. He describes the three generations as an evolution of line and staff responsibilities observable in companies as they mature in their recognition and implementation of the P.D. concept. The three stages represent an increasing number of functions placed under the jurisdiction of the P.D. director. Therefore, a progression in stages must be accompanied by organizational changes in the company.

Exhibit 2, on page 53, shows an organization chart which might typify Mr. Stewart's first generation. The head of physical distribution activities has complete line authority over only transportation and warehousing. The rest of the major P.D. functions are placed under other company executives.

Exhibit 3, on page 53, represents Mr. Stewart's third generation or-

ganization chart. At this stage, the director of physical distribution has complete line authority over eight major functions. There is a centralized corporate staff to handle customer service, planning, cost analysis, and other staff functions identified by Mr. Stewart. The corporate staff may or may not be under the jurisdiction of the director depending on whether his position is at the corporate or the divisional level.

There are many and varied reports which contribute to the effective control of costs by the physical distribution director. One of the most essential reports for a company or an operating division of a company having several plants and distribution centers would be an operating performance report. This type of report would be a responsibility report showing actual expenses and variances for the expense accounts in each physical distribution cost center for each branch, distribution center, or warehouse. An example is shown in Exhibit 4, page 54.

Budgeted amounts may be based on standards set or on historical data. The format illustrated in Exhibit 4 is an example of the operating performance report, usually labeled an expense statement.

Some of the titles of the reports requested by physical distribution managers are listed in Exhibit 5, page 54.

Most of the reports shown in Exhibit 5 are based on the costs and expenses accumulated in the accounting system of the company. Others, such as stock transfer, warehouse space utilization, and weekly back order reports are statistical reports from other source data.

What modifications in the accounting system have been made in those companies where organizational changes have taken place to improve the management of P.D. functions? Has there been an effort to change the system of accounts to coincide with functional lines of authority?

There are many indications that modifications have been made in

EXHIBIT 2

TYPICAL PLACEMENT OF PHYSICAL DISTRIBUTION FUNCTIONS

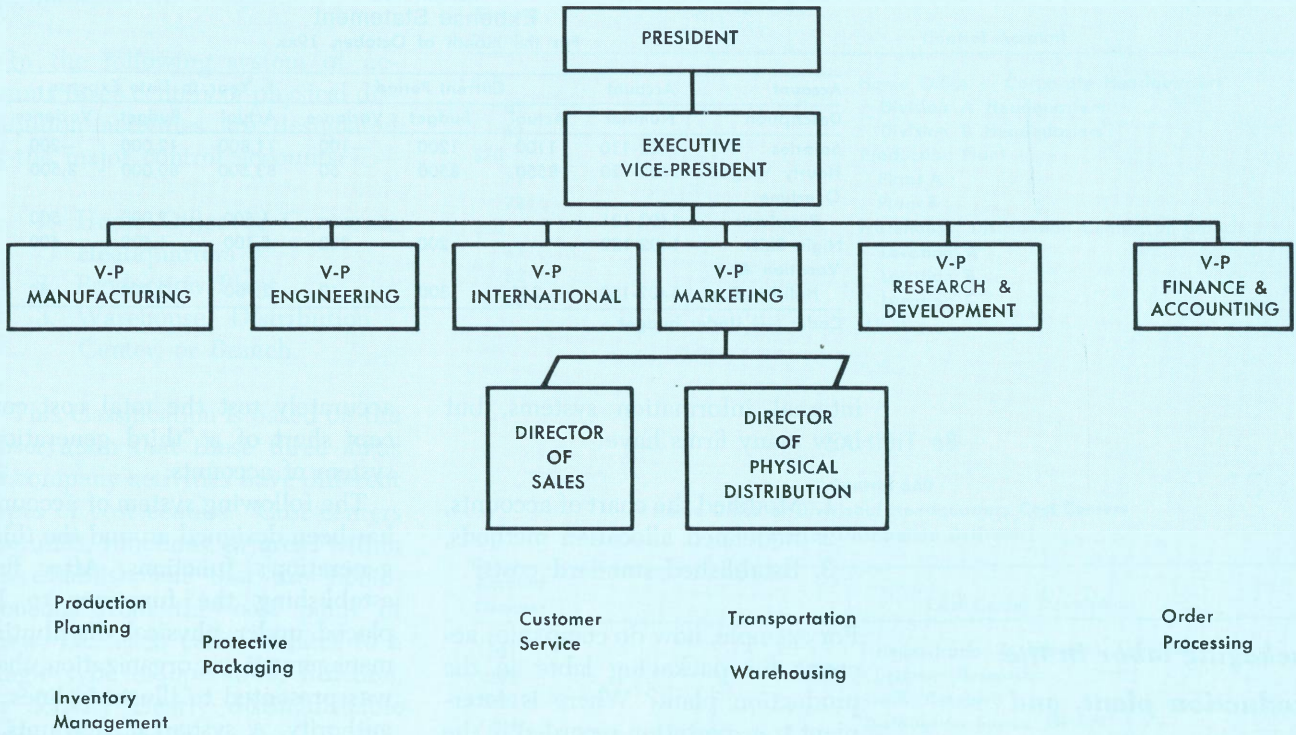


EXHIBIT 3

THIRD GENERATION ORGANIZATION CHART

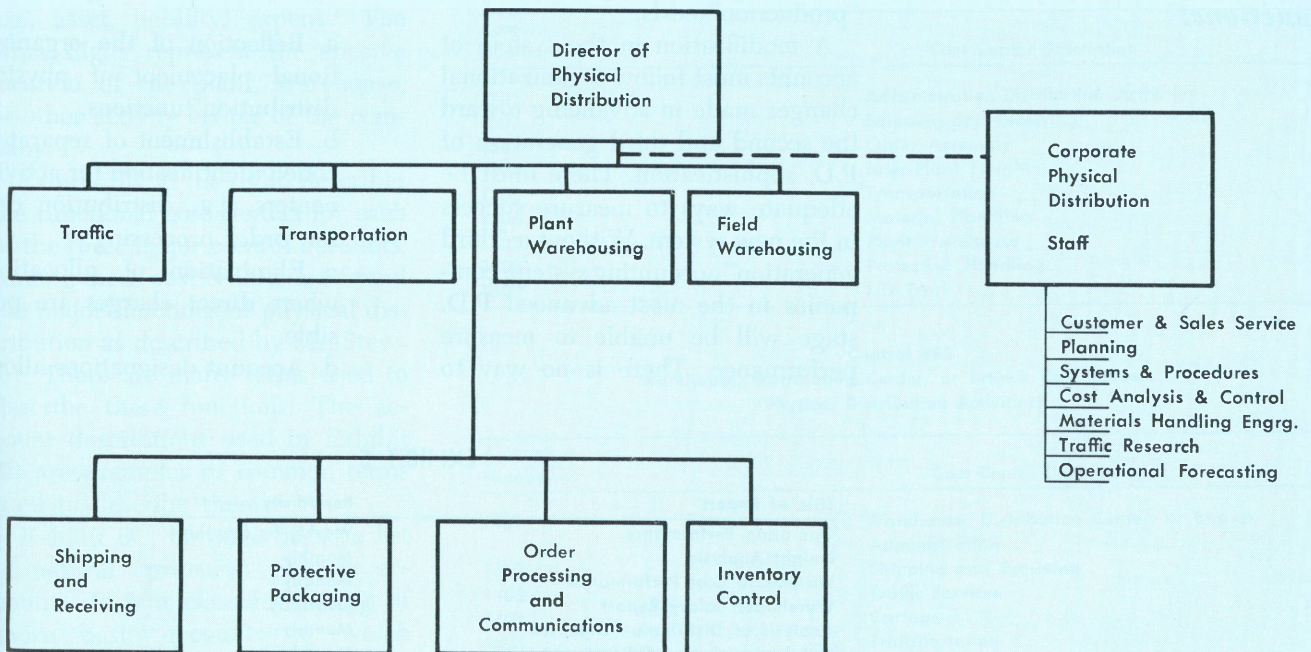


EXHIBIT 4
ANGOLA DISTRIBUTION CENTER
Control 881
Expense Statement
For the month of October, 19xx

Account Description	Account Number	Current Period			Year to Date Expense		
		Actual	Budget	Variance	Actual	Budget	Variance
Salaries	1402-110	1100	1200	-100	11,800	12,000	-200
Hourly Wages	1402-120	8550	8500	50	83,500	80,000	3,500
Overtime							
Premiums	1402-131	—	—	—	1,500	2,000	-500
Night Shift	1402-132	—	200	200	2,100	1,500	600
Vacation & Holiday Pay	1402-133	310	300	10	2,950	3,000	-50

Code: (—) Under budget

Packaging labor in the production plant, and interplant transportation are traditionally recorded as manufacturing costs, although actually they are physical distribution functions.

internal information systems, but how many firms have:

1. Modified the chart of accounts,
2. Redefined allocation methods,
3. Established standard costs?

For example, how do companies account for packaging labor in the production plant? Where is interplant transportation recorded in the accounting system? You will find that these and other related physical distribution functions are traditionally charged directly to manufacturing or to manufacturing overhead. They are subsequently applied to inventory along with other "production" costs.

A modification in the system of accounts must follow organizational changes made in advancing toward the second and third generation of P.D. sophistication. There must be adequate ways to measure success in the new system. Without a "third generation" accounting system, companies in the most advanced P.D. stage will be unable to measure performance. There is no way to

accurately test the total cost concept short of a "third generation" system of accounts.

The following system of accounts has been designed around the third generation's functions. After first establishing the functions to be placed under physical distribution management, an organization chart was presented to illustrate lines of authority. A system of accounts is now presented to illustrate how these same functions might be accounted for.

A third generation system of accounts for physical distribution functions should have the following characteristics:

- a. Reflection of the organizational placement of physical distribution functions.
- b. Establishment of separately coded identification for activity centers, e.g., distribution center, order processing.
- c. Elimination of allocations where direct charges are possible.
- d. Account designations allow-

EXHIBIT 5

Title of Report	Periodicity
Operating Performance	Weekly or Monthly
Freight Analysis	Monthly
Warehouse Cost Performance	Monthly
Warehouse Salary Report	Quarterly
Analysis of Distribution Expenses	Monthly
Distribution Center Office Expense	Monthly
Public Warehouse Cost	Monthly
Space Utilization	Monthly
Excess Freight & Handling Costs	Monthly
Freight on Interplant Shipments	Monthly
Total Outbound Distribution Costs	Monthly or Quarterly

ing summarization of all P.D. costs.

e. Internal reporting systems modified to report summarized information.

In the following system of accounts three centers of physical distribution activities are designated as the major control accounts:

1. Home Office or Corporate Headquarters
2. Production Plant
3. Warehouse, Distribution Center, or Branch.

This classification is based on the observation that these three areas of company activities have different types of cost centers. "Cost centers are units, functions, or areas within an establishment that are homogeneous from the cost point of view, i.e., each center relates to a single type of operation, function, or activity clearly distinguishable from all others."²

Exhibit 6A, at the right, shows the control accounts for these three categories. A control account is a summary account for which the detail is kept in a subsidiary ledger. The first digit represents the general ledger account classification, e.g., asset, liability, expense. The other digits represent the specific location of the plant, warehouse, or other activity center of the company.

Exhibit 6B, at the right, describes the functional cost centers for each of the three major control accounts. Among these cost centers are found the major functions of physical distribution as described by Mr. Stewart. There are many terms used to describe these functions. The account descriptions used in Exhibit 6B are examples of common terms used to describe them.

Exhibit 6C, on page 56, is a list of natural (primary) expense accounts. It is a classified listing of those basic accounts to which charges are made for labor, sup-

² Dickey, R. J., *Accountant's Cost Handbook*, 2nd ed., New York, Ronald Press Co., 1960, p. 938.

EXHIBIT 6A CONTROL ACCOUNTS FOR PHYSICAL DISTRIBUTION ACTIVITIES

Control Account Number	Control Account
860	Home Office — Corporate Headquarters
61	Division A Headquarters
62	Division B Headquarters
870	Production Plant
71	Plant A
72	Plant B
880	Warehouse, Distribution Center, or Branch
81	Location A
82	Location B
83	Location C

EXHIBIT 6B

Control 860 Home Office or Divisional Headquarters Cost Centers (Physical Distribution Activities)

Account Number	Cost Center Description
1201	Administration-Distribution Activities
1202	Customer Research
1203	Traffic Research
1204	Distribution System Design
1205	Distribution Cost Analysis and Control
1206	Planning: Operations, Production, Inventory, and Procurement
1207	Order Processing and Communications
1208	Inventory Control

Control 870 Production Plant Cost Centers (Physical Distribution Activities)

Account Number	Cost Center Description
1301	Administration-Distribution Activities
1302	Shipping and Receiving
1303	Order Assembly
1304	Inter-Plant Freight
1305	Transportation
1306	Material Handling
1307	Plant Warehouse
1308	Protective Handling
1309	Lift Truck

Control 880 Warehouse, Distribution Center, or Branch Cost Centers (Physical Distribution Activities)

Account Number	Cost Center Description
1401	Warehouse, Distribution Center, or Branch Administration
1402	Shipping and Receiving
1403	Traffic Services
1404	Cartage
1405	Transportation
1406	Material Handling
1407	Storage
1408	Packaging
1409	Equipment and Building Costs

EXHIBIT 6C

NATURAL EXPENSE ACCOUNTS FOR PHYSICAL DISTRIBUTION COST CENTERS

<p>110 Salaries & Wages</p> <ul style="list-style-type: none"> 111 Salaries 112 Administration 113 Supervision 114 Clerical 115 Other 120 Hourly wages <p>130 Payroll Premium</p> <ul style="list-style-type: none"> 131 Overtime premiums 132 Night shift 133 Vacation and holiday pay <p>140 Employee Benefits</p> <ul style="list-style-type: none"> 141 Payroll taxes (FICA & Unemployment) 142 Pension plan 143 Insurance 144 Saving and bonus 145 Employee purchase discounts <p>200 Outside Activities</p> <ul style="list-style-type: none"> 201 Labor and services 202 Storage (space rental) 203 Equipment rental 204 Financial services <p>220 Communication and Travel</p> <ul style="list-style-type: none"> 221 Telephone and telegraph 222 Dues and subscriptions 223 Postage 224 Travel <p>240 Equipment</p> <ul style="list-style-type: none"> 241 Supplies 242 Maintenance and repairs 243 Depreciation 244 Taxes 245 Insurance <p>260 Other Operating Expenses</p> <ul style="list-style-type: none"> 261 Office supplies 262 Shop supplies 263 Boxing and packing material 264 Customer service—other allowances 265 Demurrage 	<p>280 Facilities Expense</p> <ul style="list-style-type: none"> 281 Maintenance—buildings 282 Utilities 283 Housekeeping 284 Rent—space 285 Rent—tax and insurance on leased premises 286 Taxes—building 287 Insurance—building 288 Depreciation—building 289 Amortization—leasehold 290 Trash collection 291 Laundry and janitorial <p>300 Inventory</p> <ul style="list-style-type: none"> 301 Taxes 302 Insurance 303 Financial carrying costs 304 Losses from deterioration or obsolescence <p>400 Transportation</p> <ul style="list-style-type: none"> 401 Carrier freight 402 LTL 403 Truckload 404 Rail 405 Air 410 Parcel post 420 Company-owned or leased <p>500 Allocations from Other Cost Centers (budget units)</p> <ul style="list-style-type: none"> 501 Industrial relations 502 Data processing 503 Accounting 504 Industrial engineering 505 Medical services 506 Printing services 507 Cafeteria 508 Plant protection
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or to a periodic expense account. Since this charge originated at a production plant it would normally be charged to product costs and not to a physical distribution expense. This is the point at which the accounting system should be in harmony with the organizational chart. If this function is part of production it should be identified as such. However, if it is organizationally a physical distribution function it should be so identified in the chart of accounts.

Summary

In the early 1960s, physical distribution was described by Peter Drucker and others as the last frontier for cost reduction in the business organization.³ In a single decade the physical distribution concept has grown to a position of major importance in American industry.

The growth in the physical distribution concept has focused attention upon cost control. Physical distribution functions are cost centers not profit centers.

An abundance of evidence is available showing that companies have made organizational changes which reflect top management's recognition of the relatively new physical distribution concept.

Although organizational improvements have been made in many companies to establish better control of P.D. functions, there has usually been no major change in the system of accounts in these same companies.

It has been proposed in this article that there should be modifications in the system of accounts to accompany organizational changes. These modifications should recognize the functional nature of physical distribution activities regardless of their location. To illustrate the proposed modifications a list of functions, an organization chart, and a system of accounts have been presented.

³ Drucker, Peter, "The Economy's Dark Continent," *Fortune*, April, 1962, pp. 103-4.

plies, materials, facilities usage, and services. Direct charges are represented by accounts 110 through 420. Allocated charges from other cost centers are shown as 500 accounts.

Examples of charges involving physical distribution activities are given below:

1. Fork lift truck operator's daily wages at Production Plant B:

Control Account	Cost Center	Natural Expense
872	1309	120

2. Telephone service at home office—Corporate headquarters:

Control Account	Cost Center	Natural Expense
860	1201	221

3. Transportation charge from Warehouse A via air:

Control Account	Cost Center	Natural Expense
881	1405	404

At Plant B a fork lift operator's periodic hours are recorded on his time card and eventually on the payroll summary. The production facility has a cost center identified as "Lift Truck" which is assigned the code number 1309. The natural expense is called hourly wages, which is assigned the number 120. The control number 872 represents the Production Plant B. The control account number indicates the major account classification showing whether it is to be charged to cost of goods manufactured