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ABSTRACT

This publication presents a system of gathering overhead data and describes several methods for assigning overhead costs to specific contract prices. It is intended to provide facility production supervisors with a means of ensuring adequate cost recovery in bid prices and gaining a measure of overhead cost control. The seven steps in the overhead determination system are outlined: (1) define cost centers, (2) define direct and indirect costs, (3) determine each cost center allocation basis, (4) collect overhead expenditures into pools, (5) allocate overhead expenditures to cost centers, (6) determine cost center overhead rates, and (7) apply overhead rates to products and services. Each step is examined using a facility example. The example facility, given the fictitious name, Rehabilitation Services, Inc., is assumed to be a multidepartment facility providing many service options for persons with disabling conditions. The entire system is presented in a decision-making flow chart found at the end of the manual. A bibliography is appended. (YLB)

EFFECTIVE DETERMINATION OF

OVERHEAD RATES

FOR PRICING GOODS AND SERVICES

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EFFECTIVE DETERMINATION OF OVERHEAD RATES FOR PRICING GOODS AND SERVICES

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PREFACE

The Materials Development Center [illegible] significant amounts of time and energy determining the informational needs of facility staff. Our mission and reason for existence is to provide new informational materials to help rehabilitation facility staff provide better services to persons with disabling conditions. In order to be certain that our original materials meet existing needs we listen to facility problems voiced in many ways.

A recent seminar conducted by the Commission on Accreditation of Rehabilitation Facilities (CARF) in Tucson, Arizona, gave the author an opportunity to hear about problems within facilities from accreditation surveyors and facility personnel. This publication was written in response to one of the concerns voiced at that seminar and documented by other forms of need analysis.

To remain effective in the development and dissemination of new "how-to" materials for rehabilitation facilities, the Materials Development Center will continue to listen carefully to problems as expressed by facility personnel. However, facility staff must express their needs for us to hear and respond. Write to us at the Materials Development Center, Stout Vocational Rehabilitation Institute, University of Wisconsin-Stout, Menomonie, Wisconsin 54751.

Christopher Smith

May 1985

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OVERHEAD DETERMINATION IS OFTEN CITED AS A PROBLEM

According to CARF analysis of facility surveyor deficiency citations, section III.K.34 is a statement most often cited as substandard. This standard reads as follows: "an overhead markup supported by precise written analysis of production costs," should be added when bidding contracts. "The value of any services, equipment, or space provided by the facility for the contract operation should be included in the determination of this markup." (CARF, 1985). Many facilities fail to support their overhead markup. Overhead markups must not be arbitrarily added to direct costs for products and service.

The use of arbitrary markups is also a violation of federal regulations governing the operation of facilities. The U.S. Department of Labor requires that facilities compete "fairly" with commercial enterprises. "Fair competition," when estimating the cost of products and services to establish contract prices means that the estimate includes all costs of materials and supplies; all labor costs, and all overhead costs, including general administrative expenses, industrial overhead and selling expenses.

Facility accountants routinely gather data on the direct costs of material and labor used in producing products or providing services. Facility accountants also gather data on the indirect materials and labor required in their operations. However, the assessment of these cost data associated with products and services is often inadequately applied by production supervisors when determining prices. The inappropriate use of costing data usually results from the view that overhead costs are too difficult to associate with individual areas.

Treatment and assessment of overhead data are not difficult tasks. Most facilities already have all necessary data on their balance sheets. Because CAS standards require accurate overhead costing data, the Department of Labor requires fair competition, and because the recovery of all costs in a bid price can lead to facility solvency, accurate determination of overhead costs must be performed.

This publication presents a system of gathering overhead data and describes several methods for assigning overhead costs to specific contract prices. By learning to identify overhead costs and allocate them accurately and consistently, facility production supervisors can be assured of adequate cost recovery in bid prices and may gain a measure of overhead cost control.

AN INTRODUCTION TO THE OVERHEAD DETERMINATION SYSTEM

The determination of overhead expense rates for use in pricing facility products and services involves seven steps.

1. Define Cost Centers
2. Define Direct and Indirect Costs
3. Determine each Cost Center Allocation Basis
4. Collect Overhead Expenditures into Pools
5. Allocate Overhead Expenditures to Cost Centers
6. Determine Cost Center Overhead Rates
7. Apply Overhead Rates to Products and Services

At each step, facility personnel make decisions regarding their accounting methods. This system of overhead allocation to cost centers (defined later in this publication) allows great flexibility for adaptation by facilities to unique products, services, and bookkeeping systems. System flexibility results from the ability of each facility to adapt individually tailored approaches at each step. The entire system is presented as a decision-making flow chart found at the end of this manual. (See pages 58-61).

Starting with the definition of cost centers, facility personnel must decide how to define the areas for which overhead rates will be determined. Three approaches are possible: the product/service approach, the organizational approach, and the functional approach. It is possible to use several approaches in facilities with many cost centers. Facility administrators must define cost centers using these approaches and document their definitions. These

cost centers descriptions will be used at all succeeding steps in the overhead rate determination system.

After defining cost centers, the second step is the definition of direct and indirect costs. This is an important step. The definition of overhead expenses can vary for each facility and, possibly, for each cost center. These definitions are later used to determine the basis for allocating expenditures to cost centers. They are also used in the accumulation of overhead expenses by facility bookkeeping. Thus, it is important to carefully consider and document these definitions.

The third step is to choose an allocation basis for transferring overhead expenses to cost centers. Six primary methods will be discussed: units of production, the cost of materials, the amount of total direct costs, the total of direct labor hours, the total of direct labor dollars, and facility space usage. Other bases exist. Some facility administrators may choose to distribute overhead expenditures to their cost centers by methods other than described. The method used is important only in its fairness for distributing expenses. It is also possible, as in cost center definitions, that several methods may be used; different bases may be appropriate for distributing different types of expenditures. No matter which basis used, it must be documented for bookkeepers and production supervisors.

After cost centers, direct, and indirect costs have been described and the allocation basis chosen, bookkeepers collect overhead expenditures into "pools." These "pools" are simply account records that group similar expenses. Three types of pools are commonly used. They are: general administrative, sales, and building and occupancy categories. The facility's bookkeepers may use all three, or combinations, including categories that

do not follow these general groupings. Overhead account categories are chosen to accumulate like expenses. Therefore, the best groupings are those expenses that are tied by common allocation bases. These "pools" must be documented for use by the bookkeeping department.

After overhead is accumulating in bookkeeping records, the records of overhead expenditures must be transferred to cost center supervisors for interpretation and use in pricing products and services. A period of transfer must be determined that allows cost center supervisors to control overhead expenditures and to determine overhead rates for use in pricing. A common method of transfer is a monthly expense report. This method meets the control requirement but does not give enough data to the cost center supervisor to set prices. Therefore, an end of the fiscal year report is most commonly used as a basis for projecting expenses for the next fiscal period. This allows the cost center to set overhead rates that reflect the yearly operating climate of the facility.

The sixth step in the overhead determination system is the setting of cost center rates. Following acquisition of overhead data from the bookkeeping department, the cost center supervisor projects overhead expenditures for the next fiscal period. This process involves the determination of fixed and variable expenses for projection purposes, the choosing of an allocation basis with which to assign expenses to individual products or services, and the projection of overhead costs to each product or service. Using the projected overhead expenses and the chosen allocation basis, the cost center supervisor may now set the production overhead rates for application to the pricing of products and services.

In the final step, the overhead rates are included in pricing formulas when the facility bids new contracts. These rates are documented, along with the entire bidding formula. The rates are evaluated at a minimum of one year periods, certainly when new data about overhead expenditures are transmitted to the cost center.

Each year, the cost center definitions, the cost center allocation basis, and the overhead pool categories should also be evaluated for relevance to the facility's operating climate.

Throughout this publication, we will examine each step using a facility example. The example facility, Rehabilitation Services, Inc. (a fictitious name), is assumed to be a multi-department facility providing many service options for persons with disabling conditions. Included in these options is the ability to work in a vocational rehabilitation workshop that accepts production subcontracts on bid. The production supervisor in the vocational workshop at Rehabilitation Services, Inc., will be working with the workshop director, the facility's executive director, and the facility's bookkeeping department to develop a system of overhead determination that will allow subcontract bids to accurately reflect the total overhead expenditures incurred during the production process.

DEFINING OVERHEAD EXPENSES

Because overhead expenditures benefit several product or service areas, they are not easily attributed as direct costs to an individual product or service. All expenses, including overhead expenses, can be viewed as either direct or indirect in their relationship to final products or services. The separation by bookkeepers of some expenses into the overhead category is based on the ease with which individual expenditures can be allocated to specific departments.

Assigning Cost Centers

To determine how expenses will be treated, as direct or indirect costs, facility administrators may divide the facility into several areas. These areas are called "cost centers." Cost centers need not be actual physical divisions; they are bookkeeping divisions. This dividing of the facility for bookkeeping purposes allows more accurate costing of products and services and may lead to better cost control by showing which cost centers expend the most overhead. Cost centers generally follow existing departmental lines and may even be finely divided into work stations for large production areas.

When assigning cost centers, several concerns should be addressed. First, cost centers should be logical divisions of the facility. They will most likely follow present departmental lines. Second, cost centers should define production areas from service areas. One cost center should not

both produce products under contract and render interdepartmental services. Third, cost centers divisions should enhance the control of costs. Centers that give control to costs where the costs are actually being incurred will also lead to the best efficiency in reducing those costs. Cost Centers should:

Follow Logical Divisions

Define Areas

Enhance Cost Control

It is likely that several approaches will be used to determine cost centers. A facility may use a product and service grouping approach to create several cost centers in the workshop. The same facility may also use an organizational approach to group all administrative and clerical costs into one cost center. Finally, the facility may also use a functional approach to group all support service personnel in one cost center.

APPROACHES TO DETERMINING COST CENTERS

Product and Service Agency

Organizational Grouping

Functional Grouping

Cost Center description example.

In Figure 1, the possible groupings of cost centers at Rehabilitation Services, Inc. are displayed.

Because each discrete activity within the facility could be described as a center, the product and service approach would lead to the greatest number of cost centers within this facility. This approach is especially

good to use when control must be localized in order to limit expenses. This is also a good approach to use when the resulting expenditures will be allocated to many products or services, thus making a clear description of the costs involved necessary.

The organizational approach may lead to the least number of cost centers within a facility. Small facilities may find no need to further divide expenditures. This is especially true when only a few subcontracts are involved, assuming that the subcontracts absorb similar types of overhead expenditures.

The functional approach is also used when more discrete divisions are not necessary to fairly assign expenses to the prices of products and services. The functional approach is often identical to the organizational approach. Many facilities will build their organizational structures along functioning departments.

Rehabilitation Services, Inc. chose to use several approaches to meet their unique control and pricing needs. First, the product and service approach was needed to insure that the pillow work station, the pallet work station, and the pottery work station were fairly allocated overhead expenditures. These centers were needed, rather than a cost center that grouped all three, because the amount of overhead used by each center varied significantly. Second, the organizational approach was used to group all clerical, maintenance, custodial, and administrative services into one cost center. This grouping was possible because all other cost centers could be fairly assigned the total costs of these services under one allocation basis. (Allocation bases are discussed later.) Third, the functional approach was used to group physical therapy, speech and hearing therapy, nursing services, behavior therapy, recreational therapy, and sales into one cost

center called support services. This functional approach, like the organizational approach above, is possible because the expenditures for support services can be similarly allocated to the other cost centers.

FIGURE 1

POSSIBLE COST CENTERS FOR REHABILITATION SERVICES, INC.

PRODUCT AND SERVICE GROUPING APPROACH

Day activity program

Pre-vocational program

Work activities program

Pallet making work station

Pottery work station

Pillow making work station

Metal salvage work station

Janitorial contracting

Physical therapy

Speech and hearing therapy

Nursing services

Residential treatment

Group home program

Independent living program

Management

Clerical

Custodial and maintenance

Kitchen services

Behavior therapy

Recreational therapy

Sales and public relations

FIGURE 1: POSSIBLE COST CENTERS FOR REHABILITATION SERVICES, INC., CONTINUED

ORGANIZATIONAL GROUPING APPROACH

Administration

Vocational services

Residential services

Case management services

Therapy services

Custodial services

FUNCTIONAL GROUPING APPROACH

Administration

Clerical

Custodial

Support services

Residential services

Pre-vocational services

Day activity services

Vocational services

Sales and public relations

COMBINED GROUPING OF APPROACHES

Administration and general

Support services

Residential treatment services

Group home services

Independent living services

FIGURE 1: POSSIBLE COST CENTERS FOR REHABILITATION SERVICES, INC., CONTINUED

Day activity services

Pre-vocational services

Work activity services

Pillow work station

Pallet work station

Pottery work station

Janitorial services work station

Rehabilitation Services, Inc. sub-units that comprise each cost center are now described for use by the bookkeeping department. Thus, all direct costs can now be assigned to the cost center that originates them. Overhead costs, however, must be divided between cost centers and are, therefore, indirect in name and nature. Some "direct" costs assigned to cost centers may be considered as "indirect" costs when pricing a product or service of the cost center. Descriptions of direct and indirect for allocating expenses to cost centers must be developed.

Direct Costs

Direct costs are expenditures traced directly to a specific piece, part, subassembly, product, or service. This includes the cost of tools and equipment specifically used for the production of a part or the provision of a service, the cost of the materials from which the part is fabricated or used by a service, and the cost of labor used to manufacture the part

or provide the service. Key to the definition of these costs as direct costs is their clear identification with products or processes and thus, to cost centers.

All costs can be considered "direct" relative to the entire facility. However, only those costs that can be easily associated with a specific area of the facility are called "direct" costs. For example, the facility's telephone service may include extensions to many departments. These extensions share a common set of lines and the facility receives a common bill. Individual lines could be examined and all costs eventually allocated to each extension on the basis of use and, thus, considered direct costs, or they could be considered as overhead costs and allocated to cost centers on some other basis. In a small facility with few extensions, facility administrators may decide to treat the telephone costs as direct costs because they can easily attribute them to individual departments. In a large facility with many extensions, however, the task of assigning the separate charges to individual departments may be burdensome and the bookkeeping department may prefer to consider the phone costs as indirect costs.

Indirect Costs

Indirect costs cannot be directly traced to the manufacture of a specific piece, part, subassembly, product, or the provision of a service and thus to a specific cost center. These include all expenses necessary to operate and maintain the facility but not directly identified with one specific product, service, or center.

Indirect costs include janitorial service, materials handling, supervision, travel, equipment maintenance, utilities, and multi-use equipment. Indirect

costs also include overhead expenses such as administrative expenses, selling costs, and building and occupancy costs. Each facility will have a unique list of indirect costs.

These indirect costs are incurred for the common good of several areas in the facility. We will call the costs "overhead costs." The cost centers used are the same centers identified for distributing direct costs. Common overhead costs are simply added together to form "pools" of costs known as overhead. They are then assigned to the cost centers to be added to the prices of products and services.

Indirect expenses description example.

Rehabilitation Services, Inc. administrators carefully considered cost center needs for direct and indirect expense descriptions. The resulting list of expenses in each category is shown in Figure 2.

FIGURE 2

DIRECT AND INDIRECT EXPENSE CATEGORIES

DIRECT EXPENSES (To be totally charged to originating cost center.)

Cost center employee salaries

Cost center employee benefits

Client worker wages

Client worker benefits

Payroll taxes, etc. for above salaries and wages

Directly attributable materials and supplies

FIGURE 2: DIRECT AND INDIRECT EXPENSE CATEGORIES, CONTINUED

INDIRECT EXPENSES (To be shared between cost centers.)

- Administrative and general salaries and wages
- Administrative and general benefits
- Payroll taxes, etc. for the above salaries and wages
- Administrative materials and supplies
- Support services salaries and wages
- Support services benefits
- Payroll taxes, etc. for the above salaries and wages
- Support services materials and supplies
- Telephone expenses
- Professional fees
- Postage and shipping
- Occupancy
- Rental and maintenance of equipment
- Depreciation of buildings and equipment
- Miscellaneous non-directly attributable expenditures

Overhead expenses are shared by several facility cost centers.

Overhead expenses are those expenses that must be shared by several cost centers. The facility's executive director, secretarial staff, accounting personnel, and many other administrative salaries are paid for the benefit of all facility production and service areas. Thus, the cost of these administrative salaries and the supplies that the administrators use must be

distributed to all production and service areas by some fair distribution method.

This is also true of other overhead expense categories. All facility cost centers share the cost of light, heat, and space. All facility cost centers share the cost of public relations, advertising, and general maintenance. Each facility will have a unique list of overhead expenses. Most are shared by all cost centers. Some by only a few cost centers.

The methods used to distribute costs vary with the type of cost incurred.

Many different methods of allocating expenses to cost centers are possible. Many methods exist because different cost centers lend themselves to different types of distribution. Each cost distribution method will be seen as "fair" in some situations and "unfair" in others. For example, cost distribution for the heating and air conditioning of a facility may be allocated on the basis of the number of square feet of each production area. This would probably be seen as more "fair" than allocating such costs on the basis of the number of workers in each area or the total direct labor dollars expended in each area. However, allocating administrative costs on the same space allocation basis will probably cause complaints that larger spaces are "unfairly" charged with more than their share of the administrative costs. The first step in distributing costs to cost centers is the determination of cost categories on the basis of their eventual allocation.

The allocation basis allows overhead costs to be assigned to categories that will be shared with the various cost centers in the facility. Once an allocation basis has been determined, the basis should be consistently used for each cost classification from year to year.

Different cost categories may be allocated to cost centers by different allocation bases. The most predominate allocation basis in rehabilitation facilities is direct labor dollars. However, other popular allocation bases exist. Facilities may also choose to allocate expenses to cost centers on the unit of production basis, the material cost basis, the total direct cost basis, the direct labor hour basis, or the space use basis.

ALLOCATING OVERHEAD TO COST CENTERS

Like choosing cost centers, each facility must examine its own products, services, costs, and organization to determine which allocation basis to use for assigning overhead expenses to cost centers. As discussed above, the most important consideration in choosing an allocation basis is how "fair" the basis is seen by the cost centers involved.

POSSIBLE ALLOCATION BASES

Unit of Production

Material Cost

Total Direct Cost

Direct Labor Hours

Direct Labor Dollars

Space Use

Unit of Production Basis

The unit of production basis is one of the easiest and most direct methods for allocating overhead costs to product oriented cost centers. All cost center production figures are accumulated and divided by the total number of units produced (or the forecast of this number). This results in a rate per unit for assigning the overhead costs. If the facility only produces one product this would be an ideal system. However, very few single product and service facilities exist.

$$\frac{\text{Total Facility Overhead}}{\text{Total Facility Production}} = \text{Allocation Overhead Rate}$$

A modification of this basis allows it to be used for allocating blocks of overhead to separate cost centers. For example, three cost centers have been identified for producing pallets, pillows, and pottery. Rehabilitation Services, Inc. could determine the numbers of products each cost center produced, perhaps 2,000 pallets, 12,000 pillows, and 200 pots were produced during a trial period. This is a total production of 14,200 products. (See Figure 3 for a display of all costs that will be used in our Allocation Example.)

FIGURE 3

REHABILITATION SERVICES, INC.

DIRECT EXPENSES FOR VOCATIONAL COST CENTERS

	PALLETS	PILLOWS	POTTERY
DIRECT LABORERS	6	20	10
DIRECT LABOR HOURS	900	3,000	1,500
HOURS PER DAY	5	5	5
DAYS PER WEEK	5	5	5
WEEKS IN PERIOD	6	6	6
DIRECT LABOR DOLLARS	$1,800	$6,000	$3,000
MATERIALS	$3,000	$1,200	$ 600
UNITS PRODUCED	2,000	12,000	200
COST CENTER SPACE	20,000	800	2,400

$$\frac{\text{2,000 pallets}}{\text{14,200 production units}} = \text{14\% Allocation Rate}$$

By dividing the cost center totals by the total production we determine that the pallet cost center should be allocated 14% of the overhead expenses, the pillow cost center should be allocated 85% of the overhead expenses, and the pottery cost center should be allocated 1% of the overhead expenses. The total allocations would then be divided into the number of products produced to reach a pricing percentage for overhead.

However, as the products above vary in size and require different amounts of time and materials to produce, the unit of production method may result in an inaccurate distribution of the overhead expenses. Also, the product description could not be used to allocate overhead to the residential cost centers.

Materials Cost Basis

The materials cost basis is used when direct correlation exists between the materials used in producing a product or providing a service and the amount of overhead expenses incurred. This would be a good approach when a large portion of the price of a product or service is the cost of the materials used to produce the product or provide the service. It is not a logical approach, however, when the facility has more than one product or service, especially if some of the products use expensive materials and others less expensive materials or take differing amounts of time to produce.

$$\frac{\text{Cost Center Materials}}{\text{Total Facility Materials}} = \text{Allocation Rate}$$

For example, using the Rehabilitation Services, Inc. cost centers as above, the production supervisor calculates that pallet materials for 2,000

pallets cost $3,000. Further calculations indicate pillow materials cost $1,200 for 12,000 pillows and that materials for 200 pots cost $800.

The total materials costs are added, resulting in a sum of $5,000. Dividing the material costs for each center by the total material costs expended results in an allocation rate of 60% of the overhead costs to the pallet cost center, 24% to the pillow cost center, and 16% to the pottery cost center. This distribution would probably be seen as unequal in this example because of the relative amounts of time, space, and supervision needed to produce each product as well as the inability of other cost centers to use the same basis.

$$\frac{\$3,000 \text{ pallet material cost}}{\$5,000 \text{ total material cost}} = 60\% \text{ Allocation Rate}$$

Total Direct Cost Basis

Using the total direct cost basis for allocating overhead expenses to cost centers, at Rehabilitation Services, Inc., the bookkeeper would first accumulate all direct costs of labor, materials, and other direct expenses into accounts for each cost center and divides each cost center total by the total direct costs of the facility.

$$\frac{\text{Cost Center Direct Costs}}{\text{Total Facility Direct Costs}} = \text{Allocation Percentage Rate}$$

Assuming that the pallet area had direct costs of $4,800, the pillow cost center had direct costs of $7,200, and the pottery cost center had direct costs of $3,800, addition of all the direct cost accounts results in a sum of $15,800 in total direct costs. By dividing the cost center totals by total direct costs, we determine that the pallet cost center should

be allocated 30% of the overhead costs, the pillow cost center 46% of the overhead costs, and the pottery cost center 24% of the overhead costs.

$$\frac{\$4,800 \text{ Pallet Direct Costs}}{\$15,800 \text{ Total Direct Costs}} = 30\% \text{ Allocation Rate}$$

Many facilities may see this allocation method between cost centers to be "fair" for most expense categories. This basis is often used by businesses that are labor intensive, such as service organizations and consulting businesses because most of the costs associated with these businesses would be placed in the direct labor cost category. This basis also allows comparisons between cost centers that vary widely in product and service output.

Direct Labor Hour Basis

The use of the direct labor hour basis for allocating overhead costs to cost centers is often seen as a fair method. However, it requires a summarization of hours that may be misleading in some sheltered work situations. Using the Rehabilitation Services, Inc. example above, the hours used in each production area are totaled and added. Each area's total is then divided by the sum to obtain a percentage allocation.

$$\frac{\text{Cost Center Direct Labor Hours}}{\text{Total Direct Labor Hours}} = \text{Overhead Allocation Rate}$$

The pallet cost center had total direct labor hours of 900, the pillow cost center 3,000, and the pottery cost center 1,500. These centers contributed to a total of 5,400 direct labor hours. Dividing each center's direct labor hours by the total results in percentages of 17% for the pallet cost center, 55% for the pillow cost center, and 28% for the pottery cost center.

$$\frac{900 \text{ Pallet Cost Center Direct Labor Hours}}{5,400 \text{ Total Direct Labor Hours}} = 17\% \text{ Allocation Rate}$$

The primary problems associated with this method are the differences in labor "intensity" of cost centers, differences in the productivity of the clients associated with the products in the cost centers, and the need for compiling hours in a standard way.

Direct Labor Dollars Basis

The use of direct labor dollars is probably the most familiar to rehabilitation workshop personnel. It is one of the most predominately used methods for allocating costs to individual products. In this method, overhead costs are allocated to cost centers by determining the percentage of the total direct labor dollars expended by each center.

At Rehabilitation Services, Inc., the production supervisor would tally the total dollars expended in each cost center, add all center totals to obtain a facility figure for direct labor, and divide each cost center expenditure by the total direct labor dollars.

$$\frac{\text{Cost Center Direct Labor Dollars}}{\text{Total Direct Labor Dollars}} = \text{Overhead Allocation Rate}$$

As the pallets cost center expended $1,800, the pillow cost center $6,000, and the pottery cost center $3,000 in direct labor, the total direct labor dollars for this facility totals $10,800. By dividing each center's expenditure by the total, we tabulate the percentages of overhead that should be allocated to each center; the pallet cost center 17%, the pillow cost center 55%, and the pottery cost center 28%.

$$\frac{\$1,800 \text{ Pallet Cost Center Direct Labor Dollars}}{\$10,800 \text{ Total Direct Labor Dollars}} = 17\% \text{ Allocation Rate}$$

This method is time based. Total hours are translated into dollars. As many overhead costs are time based, such as power, light, and supervision,

time basis methods may be the most accurate for distributing these expenses. A disadvantage of this allocation basis, however, is that hourly rates vary between cost centers. It is also a disadvantage that some overhead costs such as occupancy and warehousing costs are not time based.

Space Use Basis

This method is one of the best to use when general occupancy costs are considered. Each cost center occupies facility space for production purposes. If all operations are carried out within this space the overhead expenses can be directly attributed to the products associated with that cost center. The space that each center occupies is compared to the total facility space available to determine the percentage of the overhead expenses the cost center will be allocated.

$$\frac{\text{Cost Center Square Footage}}{\text{Total Facility Square Footage}} = \text{Overhead Allocation Rate}$$

At Rehabilitation Services, Inc., the pallet cost center occupies 20,000 square feet, the pillow cost center 800 square feet, and the pottery cost center 2,400 square feet. This translates into a total of 23,200 square feet of production area. Dividing each center's area by the total we obtain percentages of 86% for the pallet cost center, 4% for the pillow cost center, and 10% for the pottery cost center.

$$\frac{\text{20,000 Square Feet Pallet Cost Center Occupation}}{\text{23,200 Square Feet Total Space Available}} = 86\% \text{ Allocation Rate}$$

Large Variance Between Methods

Displaying the percentages in chart form (see Figure 4) we see that large variance can occur using different allocation methods. Probably the most equitable solution is to choose several allocation methods for allocating costs to cost centers depending on the type of cost, either time or space based, and the ease of accumulation.

FIGURE 4

	PALLETS	PILLOWS	POTTERY
UNIT OF PRODUCTION BASIS	14%	85%	1%
MATERIALS COST BASIS	60%	24%	16%
TOTAL DIRECT COST BASIS	30%	46%	24%
DIRECT LABOR HOUR BASIS	17%	55%	28%
DIRECT LABOR DOLLARS BASIS	17%	55%	28%
SPACE USE BASIS	86%	4%	10%

Rehabilitation Services, Inc. administrators decided to use several allocation bases for distributing expenses to the diverse cost centers that they described in step one. Figure 5 outlines the various allocation bases to be used with the different indirect expense categories.

FIGURE 5

REHABILITATION SERVICES, INC. EXPENSE ALLOCATION BASES

Expense Category	Allocation Basis
Administrative and general salaries and wages	Total direct cost
Administrative and general benefits	Total direct cost
Payroll taxes, etc. for administration and general	Total direct cost
Support services salaries and wages	Direct labor hours
Support services benefits	Direct labor hours
Payroll taxes, etc. for support services	Direct labor hours
Support services materials and supplies	Direct labor hours
Professional fees	Total direct cost
Telephone expenses	Total direct cost
Postage and shipping	Total direct cost
Occupancy	Space use
Rental and maintenance of equipment	Unit of production
Depreciation of buildings and equipment	Space use
Miscellaneous non-directly attributable expenditures	Total direct cost

At Rehabilitation Services, Inc., total direct cost was used as an allocation basis for all administrative expenses, professional fees, telephone expenses, postage and shipping, and miscellaneous expenditures. This basis was chosen to fairly distribute these costs to the various services and work stations found in the facility. The total direct cost allows these

expenses to be allocated in proportion to the direct cost size of each cost center.

All support service expense categories will be distributed at Rehabilitation Services, Inc. on the direct labor hours basis. This basis was chosen because support service expenses are labor intensive. Cost centers with more people working in them will probably also use more support service time and materials. The direct labor hours basis was used rather than direct labor dollars to lessen the effect that professional staff would have over client workers when allocating to both residential and vocational programs.

Space use was chosen as the basis for occupancy expense allocation. As none of the cost centers at Rehabilitation Services, Inc. would be unduly allocated expenses because they take unusually large spaces in comparison with the other cost centers, this basis is probably the most fair to distribute these expenses.

Finally, Rehabilitation Services, Inc. administrator chose the unit of production basis to allocate the rental and maintenance of equipment. This effectively limited this expense category to equipment primarily used by the production cost centers.

Cost centers have been defined and allocation bases chosen for each center and cost category, direct costs can be accumulated directly into cost center accounts, and overhead costs into allocation pools.

COLLECTING OVERHEAD INTO POOLS

Overhead costs are usually grouped into three basic classifications or "pools." These pools are often defined by the allocation methods chosen by the facility. Some facilities may have many classifications with fine descriptions of the types of expenses included, or few classifications with broader definitions of the expenses included. However, most facilities will group overhead costs into three main categories (i.e., building and occupancy expenditures, general and administrative expenditures, and selling expenditures) when preparing to allocate them to cost centers. First, however, all expenditures must be recorded.

Recording Costs

We have defined overhead as "pools" of expenses that benefit more than one cost center. Facilities develop unique systems for classifying overhead expenses; first, however, all costs are normally accumulated in a set of books called the general ledger. It is in the general ledger that overhead costs are recorded by their relationship to building and occupancy, general and administrative, or selling pools. If, however, all expenses were only charged to these three large accounts, facility administrators would be hard pressed to examine overhead fluctuations. The large general ledgers are, thus, supported by subsidiary ledger accounts that detail expenses by category.

Subsidiary ledgers.

Subsidiary ledgers are groupings of individual expenses. This permits better control of costs and allows expenses to be compared with budgets. There are many ways to define expenses. A typical expense breakdown is shown in Figure 6. Very fine detail is possible for each cost center.

By collecting individual cost data in detailed accounts, facility administrators can easily monitor the expenditures of each cost center.

FIGURE 6

POSSIBLE SUBSIDIARY EXPENSE CATEGORY BREAKDOWNS

Indirect Labor	Professional Services
20 Administrative	66 Legal Services
22 Supervisory	68 Accounting Services
24 Clerical	70 Auditing Services
26 Sales & Public Relations	72 Repair and Maintenance
28 Inspection	74 Consulting Services
30 Repair and Maintenance	
32 Shipping and Receiving	Utilities
34 Production Control	76 Electricity
36 Janitorial	78 Heat
38 Accounting	80 Telephone
40 Personnel Services	82 Water

FIGURE 6: POSSIBLE SUBSIDIARY EXPENSE CATEGORY BREAKDOWNS, CONTINUED

Labor Surcharges

42 FICA
44 Unemployment Insurance
46 Workers' Compensation
48 Group Health Insurance
50 Group Life Insurance
52 Holiday Benefits
54 Vacation Benefits
56 Sick Leave

Supplies and Materials

58 Office Supplies
60 Repair and Maintenance Supplies
62 Janitorial Supplies
64 Reproduction Supplies
65 Miscellaneous Supplies

Occupancy

84 Taxes
86 Insurance
88 Lease/Rent
90 Depreciation
92 Amortization

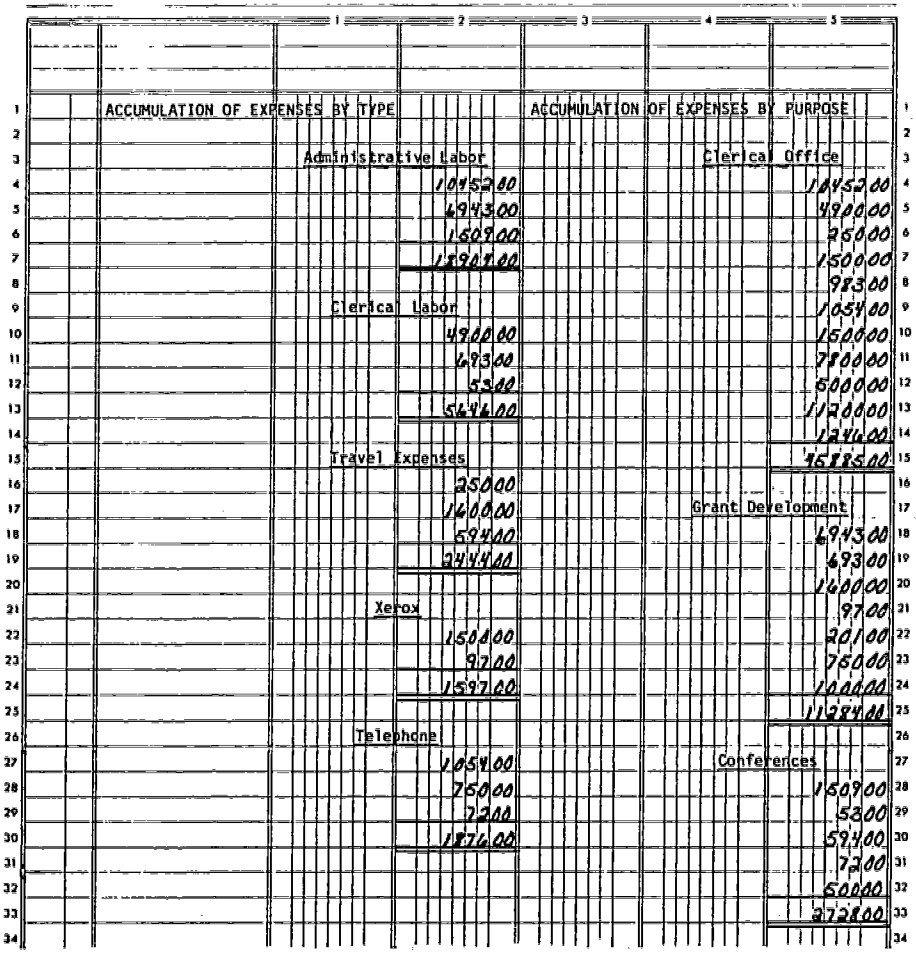
Other

94 Travel
96 Conference Fees
98 Membership Fees and Dues
100 Subscriptions

Grouping expenses by type or purpose.

When determining the categories of expenses to be used in the subsidiary ledgers, facility bookkeepers may choose to classify costs either by "type" of expense or "purpose" of expense. Figure 7 shows how each classification system would change the recording of the expenses. Use of the "purpose" scheme of recording allows facility administrators to easily monitor the various activities being carried out in cost centers.

FIGURE 7



ACCUMULATION OF EXPENSES BY TYPE		ACCUMULATION OF EXPENSES BY PURPOSE	
Administrative Labor		Clerical Office	
	10152.00		10452.00
	6943.00		4900.00
	1609.00		750.00
	18704.00		1500.00
			983.00
Clerical Labor			1054.00
	49000		1500.00
	693.00		7800.00
	53.00		600.00
	5446.00		11700.00
			1240.00
Travel Expenses			26227.00
	250.00		
	1600.00	Grant Development	
	594.00		6943.00
	2444.00		693.00
			1600.00
Xerox			97.00
	1504.00		201.00
	97.00		750.00
	1597.00		10000.00
			11284.00
Telephone			
	1054.00	Conferences	
	750.00		1609.00
	72.00		53.00
	1876.00		594.00
			72.00
			500.00
			2728.00

As each "purpose" account can also be assigned overlapping line account data, a single recording system can provide information for both "type" and "purpose" costing. This is especially true with the predominant use of computer based accounting systems. (See Figure 8)

FIGURE 8

COMBINED PURPOSE AND TYPE ACCUMULATION

Line Item Code	Type of Expense	1 PURPOSE OF EXPENSE Clerical Office	2 PURPOSE OF EXPENSE Grant Development	3 PURPOSE OF EXPENSE Conferences	4	5 Type of Expense Totals
20	Administration	1085200	69430	150900		1890400
22	Clerical	490000	6930	5300		564600
64	Xerox	150000	9700			159700
65	Printing	99300	20100			118400
72	Professional Repair	12400				12400
74	Consulting	150000	100000			250000
76	Electricity	500000				500000
78	Heat	780000				780000
80	Telephone	105400	76000	7200		187600
88	Rent	1120000				1120000
94	Travel	25000	140000	59400		224400
96	Conference Fees			50000		50000
Purpose	of Expense Totals	4588500	1128400	272800		5989700

Pooling Expenses

After recording costs by type and purpose, and at the conclusion of the recording period (which will be discussed later), overhead expenses are pooled for allocation to the facility's cost centers. As mentioned above, three overhead pools are common. These are building and occupancy,

general and administration, and selling. After pooling the expenses, they can be assigned to each cost center based on the allocation method chosen by the facility.

Building and occupancy costs.

Building rent or mortgage payments, utilities, insurance, maintenance and repairs, furnishings and equipment, trash and snow removal, are all costs that could be included in the building and occupancy overhead pool. This is not an exhaustive listing. Some facilities may expand this list to include costs not directly attributable to a particular product or service that are incurred to support production or service provision but are not necessarily building related. Such items as production supervision expense or inventory costs are examples. When such items are included in this overhead pool, it is often referred to as the "Company Overhead."

General and administrative costs.

The costs associated with general and administrative expenditures are those that are necessary simply to operate the facility. These are expenditures for the salaries of administrative and office staff, office supplies, and all related general operating expenses. The salaries and fringe benefits for all persons indirectly associated with the product or service should be included in this category. They may be the executive director, program manager, personnel director, purchasing and payroll staff, secretaries, maintenance workers (unless included in the building and occupancy category),

and other support oriented personnel. These are people who benefit more than one program in the facility. Also included are the costs of all materials, supplies, equipment, and other supportive expenses needed to run the facility.

Selling expenses.

All costs that are associated with the sales of products and services should be included in this overhead pool. These costs may be for entire marketing departments or for individual staff salaries and promotional activities. The salaries of salespeople, expenses for advertisements and public relations flyers, and any related expenses should be included in this pool. Some facilities may include warehousing and distribution expenses in the sales overhead pool and facilities with retail outlets may include display in this category as well.

Other general categories.

It is important to understand that these pools should be formed by the eventual allocation basis used for transferring expenses to individual cost centers. Thus, the groupings of building and occupancy, general and administration, and selling may also be supported by other categories.

Referring to Figure 5 (page 30), we see that at Rehabilitation Services, Inc. three allocation bases will correspond to the above pools. Under the pool of building and occupancy, Rehabilitation Services, Inc. bookkeepers would record those costs to be allocated on the space use basis. The pool of general and administration corresponds to the expense categories that will be allocated on the total direct cost basis. It also appears that

selling expenses will be included under the allocation basis of direct labor hours. However, these general categories do not encompass all the bases that will be used by Rehabilitation Services, Inc. nor do they cleanly divide all the expense categories by allocation basis. Therefore, Rehabilitation Services, Inc. developed different overhead pools to support the main pools of building and occupancy, general and administration, and sales.

Figure 9 presents the allocation pools described by Rehabilitation Services, Inc. to group recorded expenses prior to allocation to cost centers.

Rehabilitation specific expense pools.

One of the most controversial tasks in determining accurate overhead rates is the separation of rehabilitation costs from the formula. Two views are possible.

Some argue that rehabilitation costs should be subtracted from the overhead equation so that bid prices can more accurately reflect what "would be" if "normal" workers were used to produce the products or perform the services. If most of the rehabilitation costs are expensed in cost centers away from the production and service areas this is certainly a strong argument. For instance, it would be inappropriate for the production overhead to absorb expenses that are incurred in a residential department. This argument leads to the isolation of rehabilitation costs; hopefully these costs would be offset by payments from third party payers. Thus, the facility should also have an overhead pool called Rehabilitation from which expenses are allocated only to cost centers that specifically share the Rehabilitation burden.

FIGURE 9

REHABILITATION SERVICES, INC. OVERHEAD POOLS

BUILDING AND OCCUPANCY (Using the space use allocation basis.)

- Occupancy expenses

ADMINISTRATIVE AND GENERAL (Using the total direct cost basis.)

- Administrative and general salaries and wages
- Administrative and general benefits
- Payroll taxes, etc., for administrative and general
- Administrative materials and supplies
- Professional fees
- Telephone expenses
- Postage and shipping
- Miscellaneous non-directly attributable expenditures

SALES AND SUPPORT SERVICES (Using the direct labor hours basis.)

- Support services salaries and wages
- Support services benefits
- Payroll taxes, etc. for support services
- Support services materials and supplies

EQUIPMENT (Using the direct labor hours basis.)

- Rental and maintenance of equipment

Other rehabilitation professionals argue that rehabilitation costs should be included in the overhead mix as legitimate operating expenses. For instance, if a profit making organization such as a manufacturing plant, provided its employees with mental health counseling, employee assistance programs, or even a remediation department (and many major employers do provide these services), the costs associated with these services would certainly be reflected in the final price to the consumer.

This second view, to include rehabilitation costs as a category of expense within overhead, has several other strong points. Profit making companies are taking a critical look at rehabilitation facilities as they become active competitors. Some private industries complain that facilities use government subsidies to underbid contracts, that they use pity to sell services, and that their bids are inaccurately prepared (with major areas of expense left out). Only clear documentation will show that subsidies are never included in the bid price, that bids are won because they are fair and competitive, and that all categories of expenses are included. Facilities are also being asked to underwrite their rehabilitation efforts with competitively obtained revenues.

What costs then, should be included from the rehabilitation ledger? First, rehabilitation costs must be "real." That is, no add-on estimates for poor equipment or methods should be included, unproductive labor should not be included, and turnover should not be included. These are speculative areas and would clearly bias any bid price. Second, rehabilitation efforts closely tied to the production of goods or provision of service should be seriously considered as overhead. For instance, the wages of an occupational therapist should probably be included because the therapists services contri-

bute substantially to the production effort. Materials used for jig development probably should be included. A social worker probably should be included. However, a group home house parent should probably not be included. Third, the recovery of even unrelated rehabilitation costs could be considered under the area of profit. Profit can be figured in many ways. This publication does not examine profit, but one way to look at rehabilitation costs as overhead expenses is to consider them as the alternative to profit figures.

DETERMINING OVERHEAD RATES FOR COST CENTER PRODUCTS AND SERVICES

Each cost center supervisor needs to analyze individual overhead expenses when translating costs into prices for unique goods and services. After the facility's total overhead expenses are fairly divided among cost centers, each center must individually determine the basis and rate for applying the overhead costs to cost center products and services. "Departmentalized" overhead rates provide the most accurate pricing of facility contracts and allow cost center supervisors better control over their own overhead expenditures.

Transferring Overhead Expenditures to the Cost Centers

Expense data are often shared with individual cost centers on a monthly basis. Direct and overhead expenses are often compared with budget data in an expense report. This report of overhead expenses is useful to the cost center supervisor for monitoring expenditures. However, the application of overhead costs to prices involves the determination of an overhead rate and monthly fluctuations in an expense report would inappropriately influence the determination of the overhead rate. See Figure 10.

There are several reasons that applying an overhead rate calculated from monthly expense reports is not appropriate. First, not all costs that are recorded during a month are actually expended within that month. A recording delay can occur if an expenditure was made close to the end of the recording period. Delay can also occur when supplier billing cycles

FIGURE 10

REHABILITATION SERVICES, INC.

Monthly Cost Center Income and Expense Report for

Pallet Making

	Line Item Code	Description	1 Budget Month of	2 Actual Month of	3 Budget Year through	4 Actual Year through	5 Percent of Budget YTD
1		INCOME					
2							
3	1	Purchase of ser. A					
4	3	Purchase of ser. B					
5	5	Purchase of ser. C					
6	7	Sales					
7	9	Sub-contract					
8	11	Other					
9		TOTALS					
10		EXPENSES					
11		Direct-Labor					
12							
13	13	Staff wages					
14	15	Client wages					
15		Direct-Supplies & Mats.					
16							
17	17	Lumber					
18	19	Other					
19		Indirect-Labor					
20							
21	20	Administrative					
22	22	Supervisory					
23	24	Clerical					
24	26	Sales & PR					
25	28	Inspection					
26	30	Repair & Maint.					
27	32	Shipping & Rec.					
28	34	Production control					
29	36	Janitorial					
30	38	Accounting					
31	40	Personnel Services					
32		Labor Surcharges					
33							
34	42	FICA					
35	44	Unemployment Ins.					
36	46	Workers' Comp.					
37	48	Group Health Ins.					
38	50	Group Life Ins.					
39	52	Holiday					
40	54	Vacation					
41	56	Sick Leave					
42							

FIGURE 10, CONTINUED

Pallet Making Income and Expense Report

	Line Item Code	Description	1 Budget Month of	2 Actual Month of	3 Budget Year through	4 Actual Year through	5 Percent of Budget YTD
1		Indirect Sup. & Mats.					
2	58	Office supplies					
3	60	Repair & Maint.					
4	62	Janitorial					
5	64	Reproduction					
6	65	Miscellaneous					
7		Professional Services					
8							
9	66	Legal Services					
10	68	Accounting					
11	70	Auditing Services					
12	72	Repair & Maint.					
13	74	Consulting					
14		Utilities					
15							
16	76	Electricity					
17	78	Heat					
18	80	Telephone					
19	82	Water					
20		Occupancy					
21							
22	84	Taxes					
23	86	Insurance					
24	88	Lease/rent					
25	90	Depreciation					
26	92	Amortization					
27		Other Expenses					
28							
29	94	Travel					
30	96	Conference fees					
31	98	Memberships					
32	100	Subscriptions					
33							
34		TOTALS					
35							
36		TOTAL INCOME					
37		TOTAL EXPENSES					
38		BALANCE					
39							

overlap the facility accounting cycle. Second, the recording of an expenditure in a particular month may not truly reflect the time frame over which the expense was generated. For example, maintenance expense for repairing production equipment is actually incurred due to equipment wear that occurs over several monthly accounting cycles. Finally, many overhead expenses fluctuate greatly from month to month. Overhead rates calculated using the expenditure reports of a month when utility bills were either low or high could greatly distort prices for goods and services determined with that monthly rate. Thus, overhead rates must be determined by projection technique.

Projecting Overhead Costs

Methods for projecting overhead rates vary from quite simple systems to systems that are extremely complex. The complexity often increases as the size of the facility increases, probably due to the increased ability of larger facilities to devote time and resources to accounting tasks. In all systems, however, simple or complex, there are five common steps:

Step 1 - Determine the projection time period.

Step 2 - Choose a production/service allocation basis.

Step 3 - Estimate the total overhead expenses for the period.

Step 4 - Estimate the product/service volume for the period.

Step 5 - Calculate the overhead rate.

Determine the projection time period.

The projection period should be identical to the period in which overhead expenses are accumulated in overhead pools. The facility's fiscal year

is the most logical choice; accounts are normally closed at the end of the fiscal year and the account data is then transmitted to cost centers. The fiscal year is also a complete cycle, thus fully averaging out monthly fluctuations that are seasonably caused. The fiscal year has a considerable psychological advantage as well. Most people tend to plan in year increments and eventually bring contractual agreements within the framework of their fiscal year.

Choose a product/service allocation basis.

At this point, cost center product/service volume must be established within an allocation basis. Just as an allocation basis was established to transfer overhead pools to the individual cost centers, each cost center must determine an allocation basis with which to transfer overhead rates to the prices of products and services. This basis is also used to project the fixed and variable portions of the overhead expenditures for the projection period.

These allocation bases are identical to those used for cost center allocations, but it is more important to accurately reflect production fluctuations in the allocation basis used than to insure fairness in the distribution of the cost. The principle production allocation basis is the unit of production basis, the material cost basis, the machine hour basis, the total direct cost basis, the direct labor hour basis, and the direct labor dollars basis.

Unit of production.

For allocating overhead expenses to products, the unit of production basis is the most direct, and probably the simplest method. The projected

overhead expenses are simply divided by the total number of product units that are estimated to be produced by the cost center in the projection period. Each unit is then charged with a single share of the total overhead as it is produced.

This method is very equitable unless the cost center produces several types of products. This method is also difficult to use in service costing, as the unit of service may be difficult to define in discrete, identical units.

Materials cost.

If the cost center has a clear correlation between the types of materials used in its various products and services it may be desirable to allocate the overhead expenses to the cost center products and services based on the estimated cost of materials for the projection period.

This method is little used by facilities as the correlation must be based on the use of very similar materials. A possible area that may find this allocation base to be appropriate would be a pottery cost center. In such a cost center, all the products clearly use the same materials and the use of more material in a particular product could justify an increase in the amount of overhead expenses absorbed by the product.

Machine hour.

The machine hour basis is simply an accumulation of the total operating hours of machinery used in the cost center. Assuming that all products or services require the use of the machinery, and that the machinery use

hours are determined as part of the pricing process, this may be an appropriate basis.

This method does require an added data collection system, as most accounting systems do not accumulate machine hours as part of their accounting load. This method also is primarily limited to production activities as few service operations would lend themselves to such a system. A possible service area that could use the machine hour basis would be an automatic car wash.

Total direct cost.

A method of allocating cost center overhead that is used by highly labor intensive areas is the total direct cost method. All direct expenses for labor, materials, and supplies are tallied for the cost center projection period. The total projected overhead is then divided by the total direct expenses to arrive at a per dollar rate.

Direct labor hour.

An allocation basis that can be used by many service and assembly cost centers is the direct labor hour basis. Overhead expenses are projected and then divided by an estimate of the total direct labor hours that will be spent during the period to produce products or provide services.

This allocation basis requires that a tally of direct labor hours be made, which may or may not be an added task for the accounting department depending upon the way payroll figures are obtained. This basis may not be appropriate in situations where much of the labor is completed by machines.

Direct labor dollars.

This allocation basis is probably the most universally used by rehabilitation facility cost centers. It is the most equitable system to use for most cost centers as the inequalities of low rate personnel is adjusted by productivity percentages. Assuming that the cost center has adequately determined the productivity percentages used for paying the clients working in the center, the comparison of overhead dollars to direct labor dollars is fair for individual cost center products and services.

Estimate the total overhead expenses for the period.

The records of expenses are reviewed as a first step in estimating the overhead. Through this review the cost center supervisor learns the overall size and patterns of the costs to be projected for the next period. This examination can yield three expense patterns. Overhead expenses may remain fairly constant throughout the period, with little or no variation that is attributable to production volume. Overhead expenses may also change greatly throughout the period, with the variation attributable to fluctuations in production volume. Finally, overhead expenses may fluctuate throughout the period, but the variation may not be attributable to fluctuations in production efforts. These patterns may lead the supervision to separation of overhead expenses into fixed, variable, and semi-variable overhead classifications, respectively.

Fixed overhead expenses.

Fixed overhead expenses remain constant with no tie to the volume of work performed by the cost center. Rent, insurance, and many administrative expenses are examples of expenses that are considered as fixed overhead. These costs remain relatively constant no matter how high or low the total volume of work performed during the accounting period. (Even fixed expenses will fluctuate.) The exception to this fixed cost behavior for facility overhead expenses are the expenses experienced by an expanding facility. Costs that would normally be fixed will increase when new buildings, equipment, personnel, etc. are added to the cost center during expansion.

Variable overhead expenses.

Variable overhead expenses increase or decrease in direct proportion to the production of the facility. With no production output, no variable overhead expenditures are made. Production supplies, some types of utility costs, and some indirect labor costs are examples of variable expenses.

Semivariable overhead expenses.

Semivariable overhead expenses fluctuate with production output, but not in direct relationship to volume. Office supplies, telephone costs, and some administrative costs are examples of semivariable expenses. These costs have a portion of their total that acts as if it were a fixed expense and a second portion that acts as if it were a variable expense.

Segregation of overhead expenses into fixed and variable classifications.

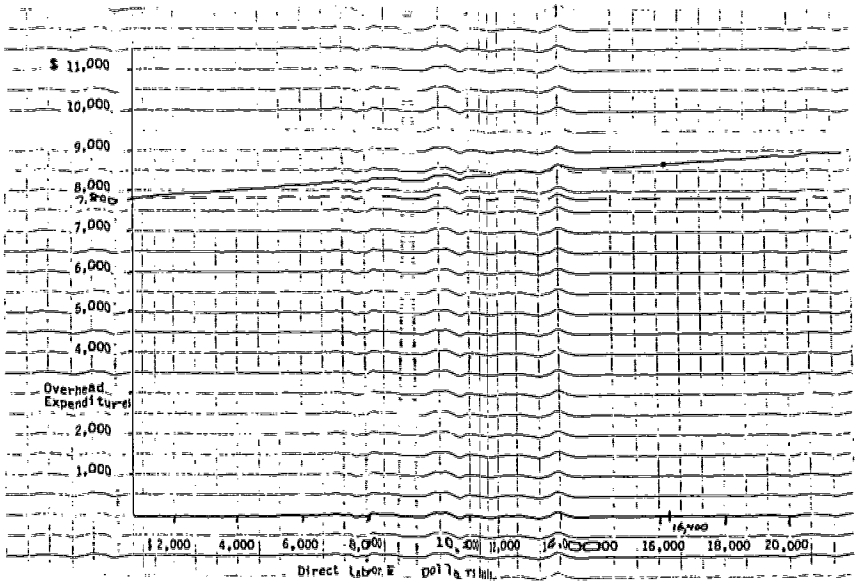
All cost center overhead expenses must be assigned to either a fixed or variable classification. Every facility costing system wrestles with the problem of the identification and segregation of variable costs from fixed costs, especially the fixed and variable portions of semivaried costs. Most facility cost centers will have a clear perception of the fixed and variable classifications, but the splitting of the semivariable expenses into fixed and variable portions is more difficult.

There is no "right" way to split overhead expenses into fixed and variable classifications: the method chosen should be the one that is the simplest, that gives the most reasonable projection of expenses, and that takes the least amount of time to apply. All systems that determine variable expense rates provide only an approximation of the actual amount of the expenses during the projection period. Many cost centers may choose not to split semivariable expenses into fixed and variable classifications. They may simply choose the most logical category in which to list the entire expense.

Determining the level of fixed overhead and rate of variable overhead.

An extremely simple method for examining fixed and variable expenses uses a two point graph (see Figure 11). The vertical axis of the graph is marked with a range of cost center overhead expense totals in dollars. The horizontal axis of the graph is marked with possible volumes of production output using an allocation basis chosen for distributing expenses, starting with zero. (Production allocation bases are examined on page 47. For this example we will use direct labor dollars as the basis of production.)

FIGURE 31



Two plottings of total overhead expenditures are made from the fixed and variable expense data gathered for the reporting period. First, the figure for the total amount of overhead that would be incurred at the zero production level is determined. This figure is usually the total amount of the reported fixed expenses. This dollar amount is plotted on the graph at the zero production point (the vertical axis). Second, the total overhead expenses for the projection period at the expected production output in direct labor dollars is determined. This figure is usually the total amount of fixed and variable expenses for the reporting period. This dollar amount

is plotted on the graph above the point representing the total production output.

A sloping line intersecting the two plotted estimate points, represents the variable portion of the overhead expenses. A horizontal line extending from the zero production point across the graph, represents the fixed portion of the overhead expenses. These representative lines can be transformed into a formula to use when determining overhead projections for any production volume. This formula is derived by dividing variable expenses by production volume and adding fixed expenses.

For example, we will assume that the pallet making cost center at Rehabilitation Services, Inc. has examined its overhead expenses and determined that it has a total of fixed and variable expenses in the amount of $8,700. The cost center supervisor has estimated that $7,800 of the overhead expenses are fixed, that is they would be incurred even if no production was carried out. An examination of the cost center's expenses for the reporting period also reveals that direct labor dollars totaled $16,400.

The cost center supervisor constructed a graph (see figure 11). On the graph a spot was marked on the vertical axis indicating that $7,800 of fixed costs were expended at the zero production point. Next, a spot was marked on the graph to indicate the expenditure of $8,700 in total overhead expenses at the reported level of production of $16,400 (in direct labor dollars). Finally, the two spots were connected with a solid, sloping line, and a broken line was drawn across the graph horizontally from the spot where fixed costs cross the zero production level marking.

Estimate the product/service volume for the period.

After considering the cost center's capacity to produce products or provide services and the potential market for the cost center's products and services, the cost center supervisor projects both the expected volume for the center's products/services in the projection period and the change in fixed rates that may occur because of expansion or other factors.

The estimate of product/service volume is simply a "best guess" for expected volume based on the supervisor's interpretation of past volume data. It is essential that this estimation be carefully considered. The volume estimate determines the overhead rate that is applied to the price of a product or service. Thus, inaccurate estimates of product/service volume can greatly affect the recovery of overhead expenses through sales. Grossly inaccurate estimates of product/service volume can affect the cost center's ability to operate.

At Rehabilitation Services, Inc. the pallet cost center produced 8,049 pallets in the base year. The cost center supervisor considered the present market and decided that a 6% increase in production should be expected. That translates (8,049 pallets x 1.06) into a projected total of 8,532 pallets for the projected year.

Calculate the overhead rate.

After all overhead expenses have been estimated for the projection period, and after the product/service volume has been estimated for the projection period, the overhead rate can be established. The rate is established by

dividing the projected overhead expenses by the projected product/service volume, described by the allocation basis.

$$\frac{\text{Projected Overhead Expenses}}{\text{Projected Product/Service Volume}} = \text{Overhead Rate}$$

At Rehabilitation Services, Inc., the pallet making cost center supervisor projected a volume of 8,532 pallets for the next year. Because the allocation basis of total direct labor dollars has been chosen to use to add overhead expenses to the price of the pallets, the projected volume must be translated into an expected direct labor figure. Using last year's total of 8,049 pallets produced, and the total direct labor figure for the same period of $16,400, the supervisor determines that each pallet produced last year used $2.03 in direct labor dollars.

$$\frac{\text{Total Reported Direct Labor Dollars}}{\text{Reported Production}} = \text{Direct Labor Per Production Unit}$$

$$\frac{\$16,400}{8,049} = \$2.03$$

To project the direct labor figure for the coming period, the supervisor multiplies the projected volume of production by the direct labor per unit dollar amount.

Projected Volume X Per Unit Direct Labor Cost = Projected Total Direct Labor

$$8,532 \times \$2.03 = \$17,319.96$$

To obtain the applicable overhead rate, the projected total direct labor, which now represents total projected production, will be used to divide into the projected overhead expenses when they are determined.

The cost center supervisor is now ready to convert the data from the graph into a working formula. The formula for determining the variable overhead rate is:

$$\frac{\text{Total Reported Variable Expenses}}{\text{Reported Production}} = \text{Variable Rate}$$

The variable rate can now be applied to any projected volume of production to find the overhead projection for any production volume.

For example, the cost center supervisor determines total variable expenses by subtracting the total fixed expenses from the total overhead expenses, $8,700 minus $7,800 equals $900. The total variable expense of $900 is divided by the reported production measured as $16,400 direct labor dollars to arrive at a variable rate of 5.49%.

$$\frac{\$900.}{\$16,400} = .0549 \text{ or } 5.49\%$$

To use this variable rate to project cost center overhead expenditures for the next year, the variable rate is multiplied by the projected production and added to the anticipated fixed dollar total.

(Expected Production X Variable Rate) + Total Fixed Rate = Projected Overhead

Thus, if the cost center supervisor expects production to increase for the projection year (in our example to a direct labor figure of $17,319.96), the total overhead expenditures can be estimated by multiplying $17,319.96 by 5.49% and adding $7,800. This results in a projected overhead total of $8,750.87. (These figures can also be determined straight from the graph in figure 11.)

($17,319.96 X .0549) + $7,800 = $8,750.87

Now all the bookkeeping will pay off in an accurately determined percentage figure that can be applied as the cost center's overhead rate. Using the figure that was projected as the basis for the total projected production (in our example we used direct labor dollars and the projection for total

overhead expenditures) it is an easy step to calculate the amount of overhead to be applied for each dollar to be spent on production.

To obtain the overhead rate, divide the projected overhead dollars by the projected production.

$$\frac{\text{Projected overhead expenses}}{\text{Projected production}} = \text{Overhead rate per unit of production}$$

In the pallet cost center at Rehabilitation Services, Inc. it was previously determined that the projected overhead expenses totalled $8,750.87. It was also projected using the direct labor dollars basis that the cost center would have production unit expenses of $17,329.96. Dividing $8,750.87 by $17,329.96 the cost center supervisor determined that the center's overhead rate was 50.5% for the projected period.

$$\frac{\$8,750.87}{\$17,329.96} = .505 \text{ or } 50.5\%$$

When applying this overhead rate, after estimating the total direct labor costs for producing a pallet the cost center supervisor simply multiplies that estimated figure by the overhead rate of 50.5%.

For example, the Ajax Supply Company has asked Rehabilitation Services, Inc. to give a bid on the production of a special pallet to be used with their new product line. After analysis of the labor involved in the production of the new pallet for Ajax, the Pallet-making cost center supervisor determines that the bid price will include a direct labor figure of $2.87 for each pallet ordered. To determine a figure for overhead expenses, the supervisor multiplies the direct labor figure by the overhead rate.

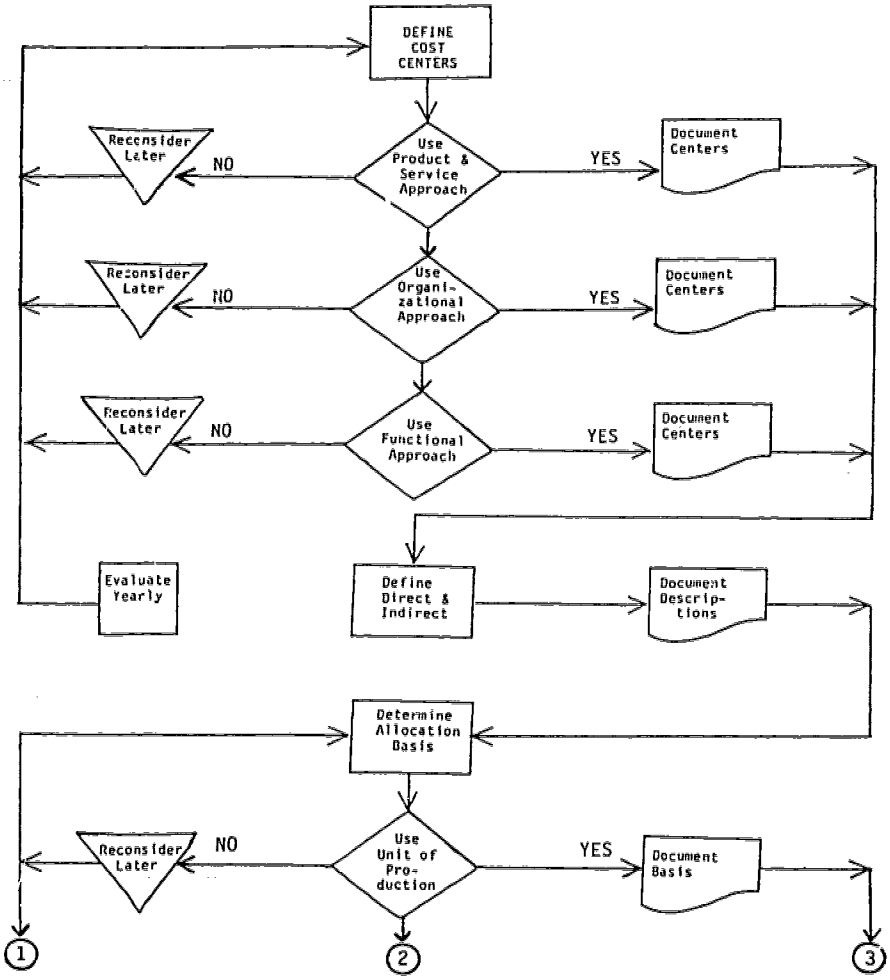
Direct Labor Estimate X Overhead Rate = Overhead Bid Estimate

In this example, the direct labor estimate of $2.87 is multiplied by the overhead rate of 50.5% resulting in an overhead bid estimate of $1.45.

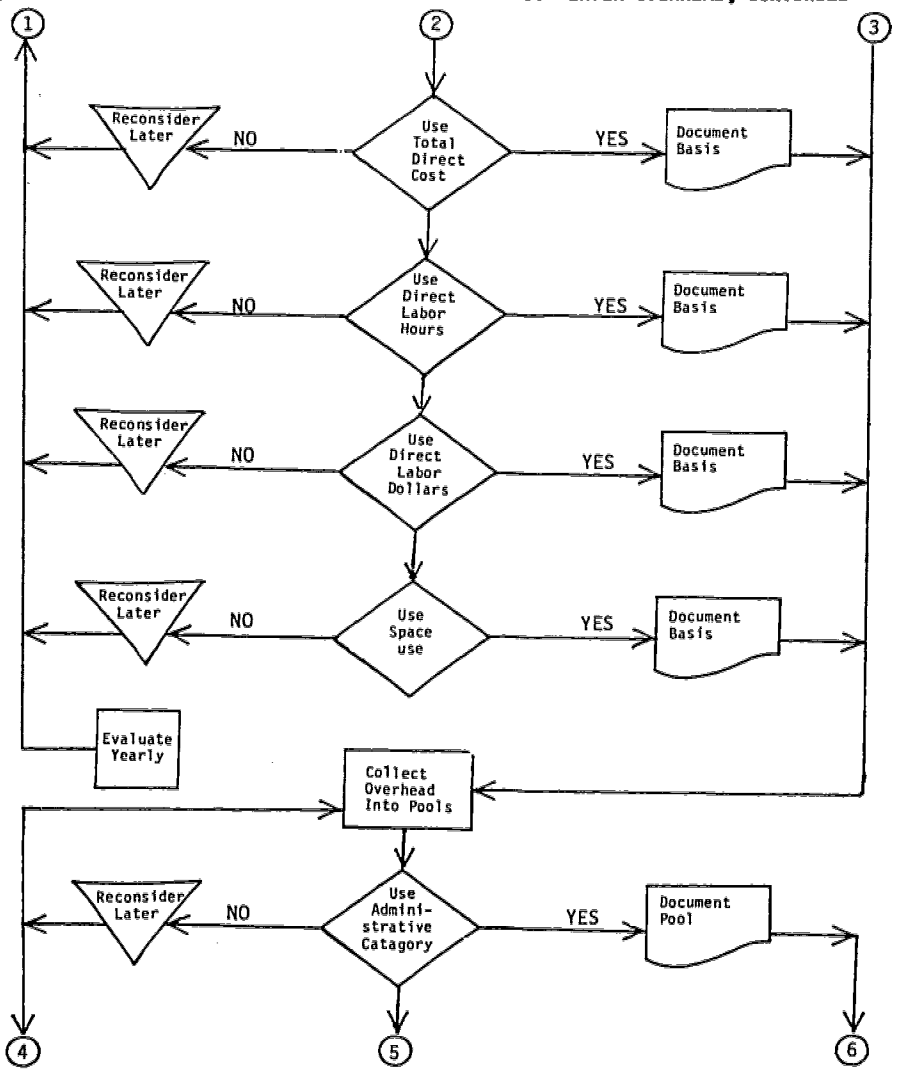
$2.87 X .505 = $1.45

Using the process described in this manual, every cost center within a rehabilitation facility can be assigned a unique, accurate overhead rate to apply to the products and services it produces or provides.

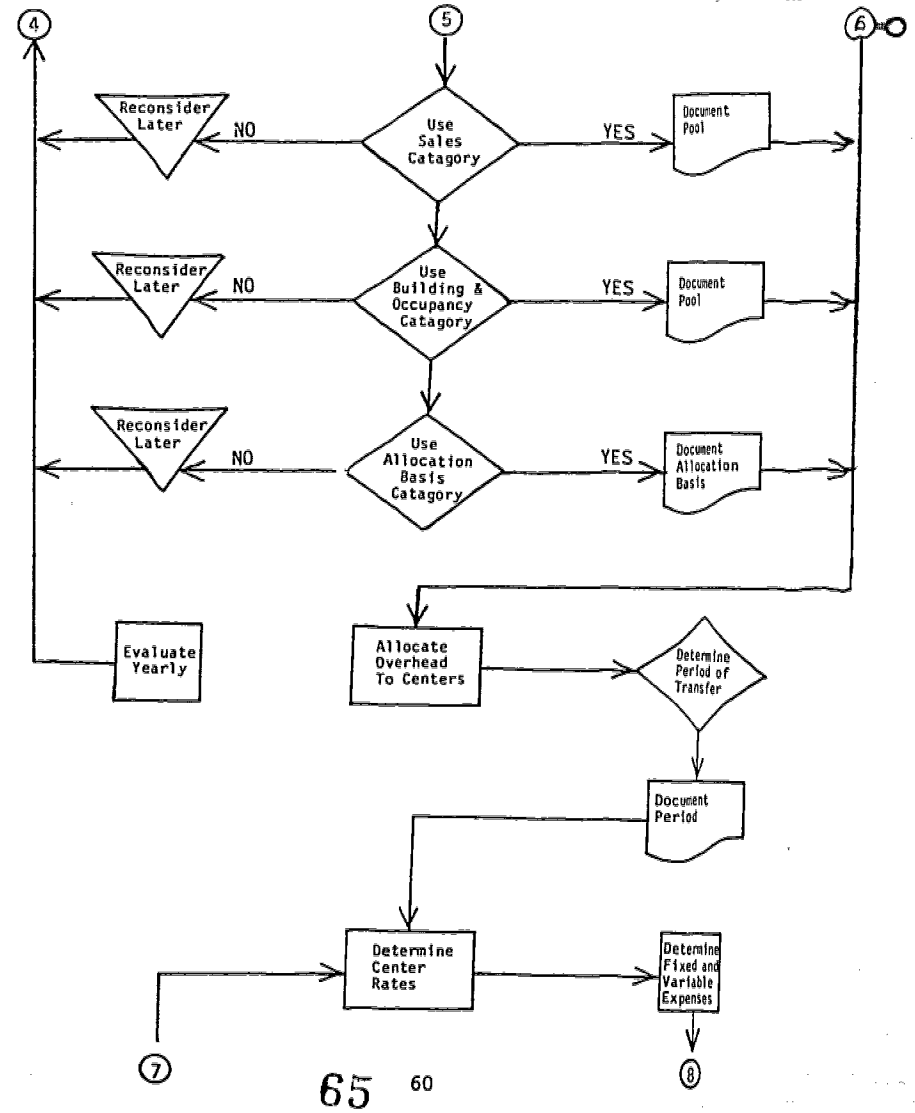
A DECISION MAKING FLOW CHART FOR DETERMINING COST CENTER OVERHEAD



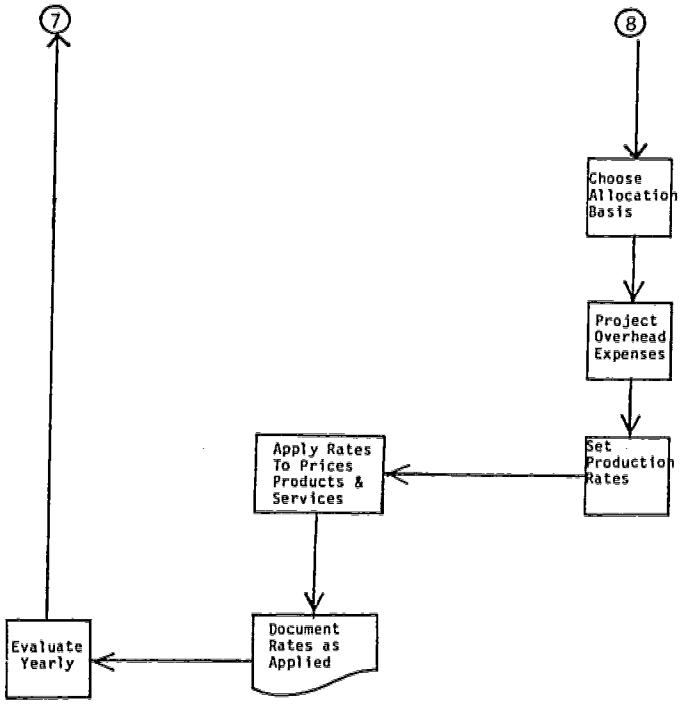
A DECISION MAKING FLOW CHART FOR DETERMINING COST CENTER OVERHEAD, CONTINUED



A DECISION MAKING FLOW CHART FOR DETERMINING COST CENTER OVERHEAD, CONTINUED



A DECISION MAKING FLOW CHART FOR DETERMINING COST CENTER OVERHEAD, CONTINUED



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