

Management Services: A Magazine of Planning, Systems, and Controls

Volume 3 | Number 6

Article 7

11-1966

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Recommended Citation

Hubler, Myron J. Jr. (1966) "Make or Buy Decision," *Management Services: A Magazine of Planning, Systems, and Controls*: Vol. 3: No. 6, Article 7.

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Make or buy decisions can be vital to the financial health of a company. And they are among the most delicate and complicated questions management must resolve. Such decisions should be reviewed and analyzed periodically in terms of all current factors.

THE MAKE OR BUY DECISION

by Myron J. Hubler, Jr.

The Reliance Electric and Engineering Company

MAKE OR BUY analysis is an area of management theory and practice with which every accountant should be familiar. Make or buy decisions must be made periodically by nearly every manufacturing company, and for many these decisions are major determinants of profitability.

The procedures for make or buy analysis can be applied to a wide range of decisions—new buildings, new equipment, tooling, parts needed for the production of goods for sale, etc. For the sake of simplicity the subject matter of this

article is limited to consideration of make or buy decisions for component parts of products manufactured for sale in the normal course of business. The following definition applies: "The right part at the right time in the right quantity at the lowest cost."¹

Thus limiting the scope of the discussion makes it possible to use the various levels of productive capacity available from the exist-

ing facilities as the basis for cost analysis. Additional complicating factors that would have to be taken into account with a broader definition of make or buy, such as the discounted cash value of the funds that would have to be invested in new equipment, the anticipated useful life of the equipment, and the like, can be omitted from consideration. Therefore, this discussion is confined to selected factors to be considered in evaluating the proposed purchase of parts from outside sources of supply even though existing internal

¹C. C. Cadiz, "Stampings — Should You Make Them or Buy Them?," *Iron Age*, September 23, 1954, p. 107.

manufacturing facilities are adequate for the manufacture of these products.

Even with these limitations the make or buy decision is frequently a complex one. There are many ways of designing the same product, and there are many materials that might be used for one reason or another. Any of these choices may require a change in manufacturing method or scheduling, inside or outside the company. With such a multiplicity of choices available, it is not surprising that a somewhat less than scientific answer is often forthcoming.

It is important that the chief executive officer of the company spell out the basic policies governing make or buy decisions—the formulas to be used and factors to be taken into account might well be included in the management procedures manual—and specify the division of responsibilities among the members of the management team. The cost accounting function might appear to be the logical one to determine whether a product should be produced or purchased, but that is not necessarily the case. Frequently the purchasing department is the one to initiate make or buy studies, and the production and industrial engineering departments often take part. For an established product line, many of the production details (including make or buy) may be left up to the particular cost centers most closely concerned.

Whatever the exact form of organization, all the specialized knowledge and skills of the management team should be applied to these decisions, and an effort should be made to ensure that the basic policies become ingrained in management thinking. Attention to the profit improvement possibilities of such decisions should become an established part of the corporate routine.

Noncost factors

Normally the make or buy decision may be assumed to rest upon

an analysis of comparative costs.

There are, however, a number of factors other than product costs that may be of significant—in some cases overriding—influence in the make or buy analysis. Among these factors to be considered are the following: capacity, product quality, seasonal and cyclical sales and production fluctuations, process secrets, employee welfare and good will, and technological innovation.

Capacity—Any decision to make or buy must be preceded by an analysis of the capacity of existing facilities. Issues to be considered include the number of shifts the facilities will be in operation; when overtime should be included (for example, if three shifts are already working); and, possibly, when work must be subcontracted at maximum capacity levels.

Quality—In most cases it is assumed that comparable quality is available from internal and external sources of supply. This is not necessarily so. When special tolerances or special skills are required in the manufacture of a part, the advantages of specialization may favor the buy decision. To some extent, however, product quality is an intangible value. Appearance may affect subjective “quality,” as in the use of chrome vs. aluminum boat fittings, without necessarily relating to “quality” as expressed in terms of product performance. Whether the part is to be an internal or external component may be an influencing factor in practical quality requirements.



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Fluctuations—In some industries the existence of seasonal and cyclical sales and production fluctuations may make internal manufacture of a part more desirable than it would be otherwise. Items that would normally be purchased on the outside can be produced on existing facilities to level out production.

Trade secrets—The need to protect trade secrets may tip the scales in favor of the make decision. Companies in defense production or those enjoying a definite market advantage from design patents or process secrets may want to do their own manufacturing in order to make sure to retain this advantage.

Employee welfare and good will—Even when a buy decision seems fairly obvious, management may, for reasons of community stability and retention of skilled labor, wish to continue to manufacture products that might be purchased more economically. The continued availability of a dependable, trained manufacturing labor force is an intangible asset whose value defies quantification for make or buy analysis. Such decisions should be re-evaluated periodically by top management.

Technological innovation—In industries that characteristically have a substantial amount of change in product from one year to the next, there is a tendency to favor outside sources of supply. The greater potential for technological obsolescence creates the risk of a much shorter period of cost recovery for manufacturing facilities and equipment. Particularly when exotic materials, highly specialized labor, special tooling, and the like must be used, manufacturers often prefer to shift the risk to suppliers if they can.

Other factors—There are other factors that may favor either a make or buy decision. If the prices charged by vendors appear unreasonably high in comparison with estimated costs of manufacturing or if special product guarantee or liability responsibilities are in-

volved, the company may lean toward manufacturing the parts itself. Trade practices of competitors, the estimated future demand and continuity of design of the product, and the value of the component as compared to the total volume of business of the product (usually based on one year's usage) may influence the decision either way, depending on the outcome of the analysis. These and other pertinent considerations that may be known to the management should be included in the list of factors to be evaluated in making an informed decision.

A schedule similar to the one shown in Exhibit 1 on this page is frequently prepared for use in evaluating the factors other than product costs.²

Product costs

There is a wide range of opinion as to the costs that should be included in make or buy analyses. Out-of-pocket, incremental, and total costs may be pertinent and should be included when appropriate.

Generally, an analysis of make or buy comparative costs should be done on a worksheet that provides for comparison of vendor quoted (or known) prices and company manufacturing costs. A worksheet form such as that shown in Exhibit 2 on page 48 is suggested for use in formal make or buy analyses. (The use of such a form is assumed in the following comments about selected costs; it should be referred to for a clearer understanding of this discussion.)

Direct variable costs—It is generally agreed that the direct variable costs should be included in the accumulated manufacturing cost. Among the direct variable costs are all direct material and direct labor and any other out-of-pocket costs. Under unusual circumstances (such as tight produc-

tion capacity) subcontract work costs may be incurred; they should be included as direct variable costs.

A common fallacy in make or buy studies is the assumption that material costs will be the same for both the vendor of parts and the manufacturer of the final product. The vendor's history, regularity, or quantity of purchases of a material may enable him to obtain lower prices than a newcomer to the field might pay. The vendor's knowledge of sources of supply is likely to be superior to that of the manufacturer. Sometimes purchasing may even be from different levels of supply; for example, the vendor may be able to buy his materials directly from the processor while the company proposing to make its own parts may have to buy from distributors.

Another fallacy is the assumption that the two companies have similar labor costs. The company proposing to manufacture may have, for example, a standard labor rate of \$3.50 an hour, while the vendor may use semi-skilled labor, students, etc., for a standard rate of \$1.75 an hour.

MAKE OR BUY ANALYSIS

Reasons for Making

1. Cost studies indicate it is cheaper for you to make than to buy.
2. Making fits your knowhow, your equipment, and your tradition.
3. Idle capacity is available to absorb overhead.
4. What you are considering is unusual or complex; direct supervision is needed to assure control.
5. Making will facilitate your control of parts changes, inventories, and deliveries.
6. The part is hard to transport.
7. The design of the part or its processing is confidential.
8. You do not wish to depend on a single outside source of supply.

Reasons for Buying

1. Cost studies indicate it is cheaper for you to buy than to make.
2. Space, equipment, time, and/or skill are not available for you to develop the necessary production operations.
3. Because of small volume, or because of other capital needs, the investment in making is not attractive.
4. You wish someone else to face seasonal, cyclical, or risky market demands.
5. The need for special techniques, or equipment, makes buying more logical.
6. You think it is best for your executives to concentrate on your specialty.
7. You want a check on your own operations.
8. Patents or customer-supplier relationships favor going outside.

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EXHIBIT I

Direct variable overhead is more difficult to define as an out-of-pocket or incremental cost. Among the overhead cost items that may be pertinent are the following:

1. Additional material handling costs
2. Indirect labor
3. Additional hourly supervision
4. Special skills or training required of employees
5. Overtime premiums (as capacity costs begin to creep in)
6. Fringe benefit costs and other variable overhead costs peculiar to a particular industry
7. Set-up and tear-down time required for equipment conversion. (Conceivably there could be down time initially to halt an operation already on the machines, set-up time for the next part, tear-down time upon completion of manufacture of the new part, and new set-up time required to resume production.)

Any unusual capacity costs incurred as a result of exceeding the normal capacity of the existing plant facilities should be included under variable overhead costs. For some products there also may be

²Carter Higgins, "Make or Buy Re-Examined," *Harvard Business Review*, March-April, 1955, pp. 118-119.

Dept. No. _____
 Project or Part # _____
 Quantity Needed _____
 Date Needed _____

MAKE OR BUY ANALYSIS WORKSHEET

DECISION

MAKE ☐ BUY ☐

Date _____

Prepared By _____

Approved By _____

	Purchased Cost	Manufactured Cost
A. Direct Variable Costs - Note A:		
1. Material - Include Variations for Major Products	\$ _____	\$ _____
2. Labor - Include Variations for Major Products		
Reroute		
Shift Premium		
Incentive Pay		
Etc.		
3. Subcontract		
B. Overhead:		
1. Material Handling		
2. Indirect Labor		
3. Hourly Supervision		
4. Training - Include Special Skills		
5. Set up		
6. Overtime Premium		
7. Vacation and Holiday Pay		
8. Fringe Costs		
9. Other Variable Costs:		
C. Semi-Variable and Fixed Costs - Note B:		
D. Other Costs and Expenses - Note C:		
1. Purchasing, Shipping, Storage, Testing, Etc.		
2. Division Administration		
3. Division Engineering		
TOTALS	\$ (NOTE D)	\$

NOTES:

- A. Separate departmental labor hour and overhead rates may be preferable to the use of composite rates.
 Total direct labor standard hours required _____

The divisional rate for overhead applied should be redetermined as substantial amounts of direct labor hours are absorbed in the make or buy products.

- B. Semi-variable and fixed costs may be included for specific items.

- C. These incremental and out-of-pocket costs are included only when quantities being considered are substantial in amount.

- D. Includes vendor's invoice price and adjustments for out-of-pocket non-compensating costs included in the manufactured cost column.

Excess capacity costs should be included. YES ☐ NO ☐

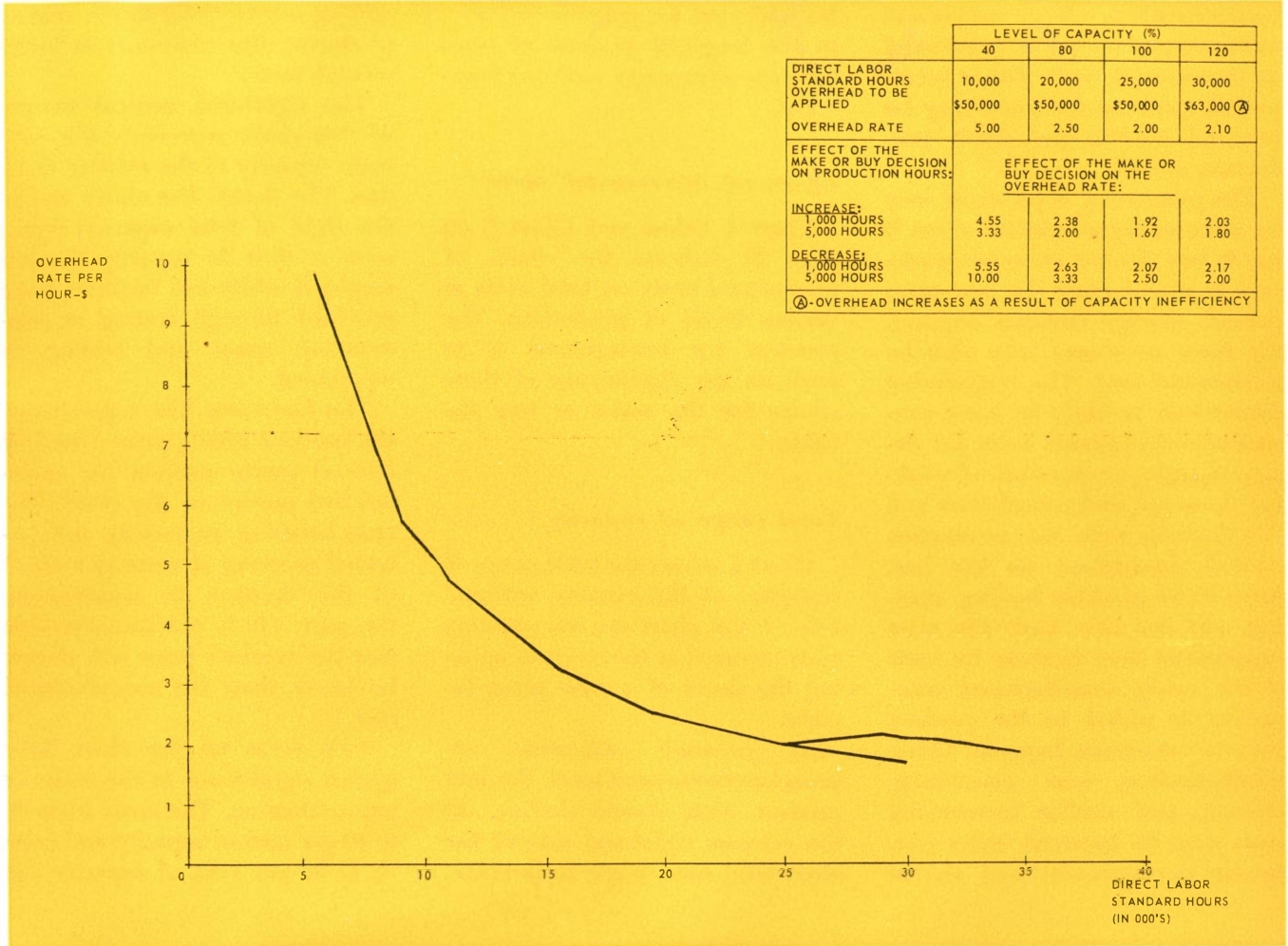
Tooling charges should be included. YES ☐ NO ☐

COMMENTS:

(Include vendor reference, delivery time, etc.)

MAKE OR BUY WORKSHEET

EXHIBIT 2



EFFECT OF CHANGES IN DIRECT LABOR ON OVERHEAD RATE

EXHIBIT 3

special tooling charges of substantial size.

Semi-variable and fixed costs

The question of whether to include semi-variable and fixed costs in the analysis is one of the most controversial in the discussion of make or buy. Most production supervisors will insist that only direct variable (out-of-pocket) costs should be considered in any make or buy decision. Conversely, almost all the technical literature on the subject contains warnings that it may well be disastrous to ignore the fixed and semi-variable costs.

The answer probably lies in the length of the time period to be covered by the make or buy analysis. A short-run make or buy decision—for example, temporary internal manufacture of the com-

ponent—may very well be based on only direct variable costs. However, since semi-variable and fixed overhead costs will inevitably change over the long run, they should always be included in any analysis involving the long-range manufacturing program.

What is meant by the short run, and what is meant by the long run? For purposes of make or buy analysis, an adequate definition of short-run production may be devised on the basis of a representative allocation of direct labor standard hours. Production hours in excess of this would be considered long-run.

Management often assumes that if there are direct labor hours available because of idle capacity, then this labor should be put to work on manufactured products. It is important to remember, however,

that as substantial amounts of direct labor hours are applied to the manufacture of a product, any distribution of overhead based on such direct labor hours should be revised accordingly. Exhibit 3 above illustrates the effect on overhead of changes in the utilization of the manufacturer's production capacity.

Even in short-run make or buy analysis, it is frequently desirable to determine separate departmental labor hour and overhead rates instead of using a composite rate for the company. Thus, the manufacturing costs that are calculated will correspond more closely to the costs quoted by outside vendors, and departmental overhead responsibility will be more closely defined as a result.

For the long-run make or buy decision, such additional semi-

variable costs as shift premiums and incentive pay should be considered as incremental costs. Other incremental semi-variable costs may be incurred outside the direct production areas:

The purchasing department may be more costly to operate when it has to buy the raw materials necessary to manufacture the new component. Storage facilities required for these purchases may also be incremental cost. The engineering department is likely to incur substantial out-of-pocket costs for design changes, preparation of working drawings, and consultation and coordination with the production control department on the best methods of machine loading, routing, and the like. Even the sales department may increase its costs if the newly manufactured component is added to the product line, as sometimes happens. Other administrative, cost accounting, clerical, and similar incremental costs may be incurred under particular circumstances and should

be evaluated for possible inclusion in the long-run analysis of comparative advantages and disadvantages.

Effect of incremental costs

Chart 1 below and Chart 2 on page 51 indicate the effects of incremental costs on total costs at various levels of production. The problem for management is to evaluate the significance of these effects for the make or buy decision.

Total range of capacity

Chart 1 covers the total range of capacity. At the extreme lefthand side of the chart are the start-up costs incurred as the result of opening the doors of a new plant facility.

As capacity utilization approaches the normal level, the unit product costs should decline. At the extreme righthand side of the chart total costs begin to increase,

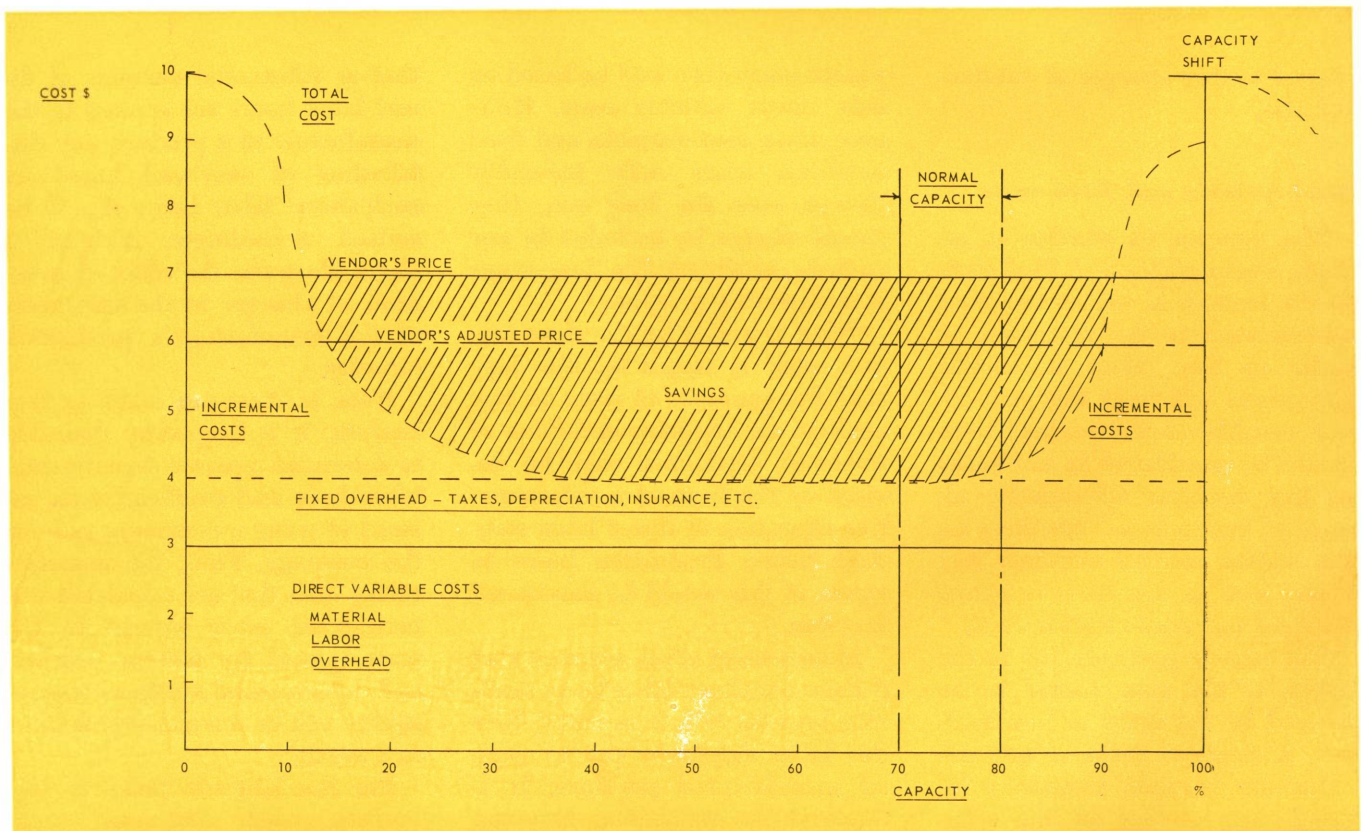
adding substantially to the cost of producing the additional or incremental units.

The righthand vertical margin of this chart represents the ultimate capacity of the existing facilities. The dotted line above and to the right of total capacity represents a shift in capacity—for example, if additional facilities were provided through renting or constructing space and adding to equipment.

The horizontal line representing the vendor's selling price (the buy option) partly outlines the cross-hatched portion of the chart. The cross-hatching represents the potential recovery of costs as a result of the decision to manufacture the part. (It is not inconceivable that the vendor's price will always be lower than the manufactured cost.)

Two areas on the chart have special significance in the make or buy evaluation. The areas from 10 to 40 per cent of capacity and from 70 to 95 per cent of capacity (as

CHART I
EFFECT OF INCREMENTAL COSTS AT ALL LEVELS OF CAPACITY



shown) may involve price concessions negotiated from vendors as an added incentive to buy.

The fixed overhead section of costs is shown directly above the direct variable costs. In many short-run make or buy studies no attempt would be made to recover these costs; only direct variable costs would be included.

Normal capacity levels

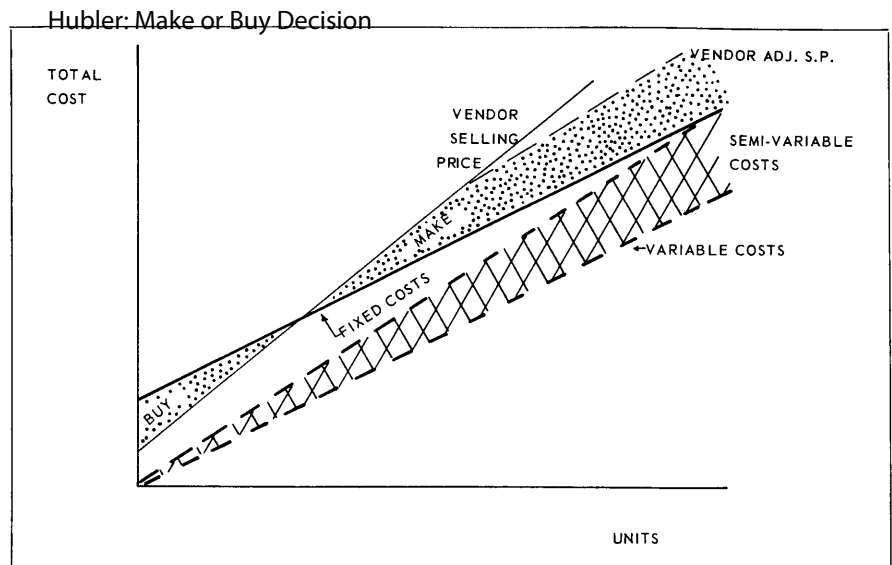
Chart 2 concentrates on costs at normal capacity levels. In this chart the usual cost relationship has been reversed; the total variable cost is shown as the initial cost incurred. The portion of fixed and semi-variable costs that will remain constant at a given capacity level has been added as a parallel diagonal line above the variable cost line.

The line representing the vendor's selling price is based on an assumption. This line has been started at a point above the variable costs and includes a portion of the fixed costs. This line rises diagonally to the right and above total costs for the manufactured part. The assumption made in thus drawing this line is that it will cross the total cost line at some point, providing the initial point for the decision whether to make or buy.

A diagonal line is drawn from zero capacity through the point at which the total cost line touches the maximum capacity level. Its purpose is to illustrate that as production increases within the capabilities of the present facilities, all variable and fixed costs must eventually be recovered.

Conclusion

This brief discussion of make or buy analysis has been designed to emphasize the importance of careful and intelligent appraisal of make or buy factors. All make or buy decisions should be completely re-evaluated on a periodic basis to avoid manufacturing stagnation and the effect of what has been



EFFECT OF INCREMENTAL COSTS AT NORMAL CAPACITY

CHART 2

termed "creeping overhead."³ Regular and systematic make or buy analysis should be a part of corporate management procedure. Responsibility for the make or buy program begins with the president of the company; specific responsibilities are frequently delegated to the controller, purchasing agent, industrial engineering department, plant manager, and/or other specialists within the corporate structure.

The statement, "It is always cheaper to manufacture than to buy," is patently erroneous and can lead to costly errors. If plant capacity is used to excess, overcrowding and other operating inefficiencies may lead to additional variable cost absorption. Rerouting of materials through the production process may disrupt load levels and scheduling on the machines. Long, efficient equipment runs may be replaced by shorter, less continuous cycles, greatly increasing such charges as set-up time, overtime premiums, and the like.

The use of out-of-pocket costs as the sole criterion for evaluation of make or buy alternatives should be avoided as inadequate. Incre-

mental costs, overhead absorption, and any other factors that may appear important to the management team should also be considered.

If short-run manufacturing cycles consume a large part of the production schedule for the manufacturing facilities, the total costs incurred should probably be analyzed on a job shop basis. This type of analysis is also appropriate for a series of long production runs on manufactured parts that use a substantial portion of the direct labor hours within the limitations of the facilities.

The final point of this discussion—and one of great importance—is that an analysis prepared for a make or buy decision should never be used as the basis for the cost computations needed to increase the gross profit percentages on sales product lines. The application of make or buy principles should not be allowed to obscure the analysis of other more complicated problems confronting management.

There is always some way to reduce product costs. The problem for those responsible for the make or buy decision is to determine which choice will save money, how much it will save, and whether the time required for the analysis is justified by the saving eventually achieved.

³A. R. Oxenfeldt and M. W. Watkins, *Make or Buy*, McGraw-Hill Book Company, New York, 1956, p. 62.