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CLEMSON APPAREL RESEARCH

FINAL TECHNICAL REPORT

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INTEGRATED COST ACCOUNTING SYSTEM

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The focus of this research project was to develop an integrated shop floor management system for an automated apparel manufacturing facility. This report documents how this objective was obtained by using the following approaches:

1) Program plan and schedule
2) Examine CAM-I CMS for apparel application
3) Develop an integrated product costing system for the AAMTD
4) Implement the work in Clemson AAMTD
5) Compare the IPCS to other traditional cost management systems
6) Coordinate with other AAMTD projects
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FINAL TECHNICAL REPORT
INTEGRATED COST ACCOUNTING SYSTEM PROJECT
CLEMSON APPAREL RESEARCH

INTRODUCTION

The idea of this project came during a time of increased awareness of the changes in costing products and processes within other industries in the United States. Activity-based costing was being used in the electronics industry, the defense industry, and in a few other companies. Harvard Business Review contained articles explaining the ideas behind the new costing methods and examples of applications. While research in other industries was growing, no one appeared interested in applying the new costing techniques to the apparel industry.

Although the manufacturing process within the apparel industry continued to be more labor intensive than the industries initially applying activity-based costing, the researcher believed that the costing techniques could be adapted to the apparel industry quite easily. This research project was granted to determine the applicability of activity-based costing to the industry and to explain the new costing techniques to members of the industry.

LITERATURE REVIEW

The first stage of the project was to conduct a thorough literature review. The bibliography of this review has been included with this final technical report. Peter Drucker in an article in Harvard Business Review [1] carefully explains that accounting must change in response to the changes in production technologies and the changes in the market place. Traditional costing methods are no longer satisfactory measures of the manufacturing environment. As manufacturing methods change, accounting and other performance measures must change to accurately reflect the operating environment. C. J. McNair [2], while stating that new costing measures are required, also stresses that strategic cost analysis is necessary. The view of costing as a historical reporting process must change to a view of costing as a timely, dynamic process linking strategic goals of a company to its performance.

The current competitive environment is taking strategic goals out of the board room and onto the shop floor. The strategies of a company need to be understood throughout the company. If everyone in a company understands the goals and plans and understands that the performance measures are meaningful gauges of the current activities, then, and only then, will a company experience significant improvements. Callan[3] clearly explains this

shift in perspective by describing the benefits Elgin Sweeper Company has received by moving from cost accounting to cost management. Once one understands the shift in perspective and understands that the performance measures are not the property of the accountants, activity-based costing is easily understood. Manufacturing companies need to eliminate intra-company competition. Accounting should not be competing with production, but should be helping the shop floor achieve improvements in performance[4].

While changing perspectives from historical to current, one will be changing perspective from a micro view of costing to a more macro view. Instead of viewing costs and cost improvements at the product or unit level, one will talk about improving the overall costs of the company which will force decision makers to examine the traditional overhead areas including management, indirect labor, supplies. The new decision makers will need to understand strategic planning, production theory, and cost management [5].

The magazines and journals of industry and business are inundating their readers with articles on World Class Manufacturing. If you work for a company not applying World Class Manufacturing methods, you are viewed as hopelessly behind the competition. World Class Manufacturing is a phrase that represents a shift in the view of a company. World Class Manufacturing means more concern about the quality levels of your product; means more concern about the customer service levels; means more concern about the cycle time of your production process and the level of your work in process inventory; means more concern about your performance measures; means more concern about your employees and your management style. The implementations in the above areas will require more integrated, data base type computer applications. The functional areas in a manufacturing environment will be cooperatively solving problems as they occur.

An article in Apparel Industry Magazine [6] describes the apparel industry focus on World Class Manufacturing. The new production methods, better customer interfaces, elimination of incentive pay are all described. The article does not mention changing performance measures or changing accounting methods. As a contrast an article in Management Accounting [7] describes the implementation of World Class Manufacturing at Grand Rapids Spring & Wire Company. In addition to discussing the change in production methods and management styles, the article discusses the change in performance measures and the change in the accounting system. The apparel industry must realize that implementation of World Class Manufacturing requires changes in all areas. New production techniques cannot be accurately measured with old accounting practices.

While the emphasis in activity-based costing is on how to better allocate costs to products and processes, much of the focus

in application has been on recognizing wasteful activities and eliminating them. In an article in Production and Inventory Management Journal, overhead cost elimination is described as being more important than overhead cost allocation.[8] Redefining the manufacturing processes into activities helps highlight those activities which are redundant, wasteful, or non-value adding. If all one does is apply a new allocation method without a study of the underlying current practices, maximum improvement will not be realized.

One of the underlying themes in the literature on new costing techniques is that costing theories and applications and other performance measures must change to reflect changes in manufacturing processes and environment and changes in management styles. Using an old measurement technique with a new manufacturing process will not give accurate performance results. Until just-in-time became well known, all performance measures were the property of the accountants and were financial measures of operating performance. The new performance measures include financial measures, but also include other measures (days in inventory, days in work-in-process, number of on-time deliveries).

As more research is being conducted on cost behavior, the ideas on how to trace or allocate costs to products are changing. While current standard costing allocates all manufacturing costs to the garment level based on a direct labor allocation procedures, many of the plant level or facility level costs may not be product costs. Cooper and Kaplan in a Harvard Business Review[9] article develop the idea of four levels of activities: facility sustaining activities; product-sustaining activities; batch-level activities; and unit-level activities. Comparing costs assigned to the manufacture of a drive shaft with standard overhead allocation procedures and with activity-based costing, Cooper and Kaplan forcefully demonstrate that without useful management accounting information companies may quite easily make erroneous production decisions. A major premise of their discussion is that facility-sustaining activities should not be allocated to the products. Production decisions are made considering only the other three activity level costs. For the company described in the article, almost 40 % of the costs incurred by changing the product mix were at the batch or product level.

The idea that activities rather than products incur costs is supported by Haedicke and Feil in an article describing the Hughes Aircraft activity-based costing system [10]. The costing system at Hughes was developed over a five-year term. Employee involvement was stressed and periodic meetings were held with the outside auditors and a representative from the Defense Contract Audit Agency (DCAA). The final activity-based costing system was agreed to by the company's DCAA representative even though it was a departure from the previous idea of building cost structures based a direct labor based allocations.

From an extensive review of the current literature, one sees that as production processes, methods, and technologies change the accounting systems should change as well. Companies utilizing only a few new technologies have significantly benefitted from a changed costing system.

RESEARCH RESULTS

Does the apparel industry need to shift to activity-based costing? An affirmative answer to one of the following questions indicates that costing structures and methods should be updated.

1. Has the competitive environment changed?
2. Has the industry initiated new manufacturing techniques?
3. Has the strategic emphasis of the industry changed?
4. Have personnel policies changed?

From this researchers experience within the apparel industry, all of the above questions have an affirmative answer.

The apparel industry in response to a changing competitive environment has implemented many changes. Improved communication networks between suppliers, manufacturers, and customers have been developed eliminating time in the production cycle. The industry is more concerned with manufacturing a quality product the first time. Incentive systems are being implemented to reflect the new manufacturing strategies. In an industry that has maintained throughout the years that piece rate pay is the only compensation system that is applicable to the production techniques, we are seeing a change to other compensation systems. And yet, we are continuing to cost our garments using ideas developed almost one hundred years ago. Activity-based costing is not the only alternative system being developed; it is the system with the best record across many different industries. The time has come for the apparel industry to adapt new costing methods to reflect their changing internal and external environments.

The integrated cost accounting system design process started when the Clemson Apparel Research facility was announced. The system designed for this project was designed specifically for Clemson Apparel Research. All production information is based on the Foxfire Realtime System installed at Clemson Apparel Research (CAR). The Foxfire system collects the labor information by operator, by bundle, and by cut number. The cut numbers are unique and are used to accumulate the cost information by style. The Foxfire system reports actual sewing time for each operator by scanning an optical bundle ticket which is used before and after the bundle being processed.

The production system at CAR is slightly different than one encountered in the industry. The skeleton staff at CAR sews four days a week. Fridays are demonstration days and the production staff is supplemented by workers from area companies. CAR has no accounting department, purchasing department, personnel department, or engineering department because of its position as part of the university system. All of the above functions are handled within the CAR personnel and within the university departments. While the goods produced are delivered to outside vendors, the production schedules are not as rigid or as critical as they would be within the industry. The purpose of CAR is to demonstrate new technology and this purpose is being fulfilled in an excellent manner. As the modular manufacturing area and the unit production area were added, the Foxfire system was expanded to include these work stations.

In the initial stages of this research project, an attempt was made to determine the average costing methods used in apparel manufacturing today. In addition to information obtained through discussions with Ed Hill and other Clemson Apparel Research employees, the researcher visited five different manufacturing facilities - an Oxford Industries plant which manufactured men's shirts, Piedmont Industries which manufactured men's shirts, an Iva manufacturing plant which was making women's apparel, a plant of Jantzen which manufactured ladies sportswear, and a plant of Red Kap which made men's work clothing.

The researcher had a tour of each of these facilities and a discussion with management on how the garment costing was currently being calculated. In each of these five plants, standard costing was being used. Although there was variation in the makeup of the overhead, all five plants allocated overhead based on the direct labor hours in the sewing department. In talking with the plant personnel, the researcher discovered that the cutting department was always discussed in terms of cuts, but that cutting department overhead was allocated, not based on cuts, but based on the direct labor hours involved in the cutting department. When asked if the overhead could be meaningfully allocated based on the number of cuts made during the month, the researcher was told that was a good idea but no one does it that way.

During discussions of a per cut allocation rather than a direct labor allocation as it is currently being done, the idea occurred that the number of setups one has to make in the cutting department governs the actual costs of the department rather than the labor involved in the department. The number of setups determines the labor usage.

As each of the plant tours moved into the sewing departments, different plant layouts were observed. Two of the plants were using modular manufacturing techniques; the remainder were using standard line layouts. The pay for the sewing operators was

calculated a little differently between these two systems, but the amount of direct labor hours and dollars were being captured.

Once each tour reached the accounting office, questions were asked about their costing systems. All plants toured used standard costing with overhead being allocated based on direct labor. Iva Manufacturing used a return on investment idea in addition to the direct labor allocation.

A thorough review was made of the components of overhead in each company. In all cases overhead included indirect manufacturing costs (utilities, supervision, fringe benefits, repair and maintenance department expenses, cleaning expenses, and indirect materials), depreciation, and a plant allocation of corporate and division overhead (Appendix A has a further discussion of current standard costing techniques and contains the materials the researcher uses for the Fundamentals of Apparel Course offered by Clemson Apparel Research.) The sample departments were allocated as overhead as were design costs. The researcher had difficulty understanding an allocation for design costs when the garments produced in a particular facility had not been redesigned. In ensuing discussions with plant personnel, the researcher determined that design costs are not currently being allocated to the garment level. The majority of companies allocate design costs from the corporate level to the division level to the plant level as an allocated corporate overhead cost. When the design costs are used in the financial statements at the plant level, they are deducted after costs of production and are not assigned to the garment. In a few instances, the allocated design costs were included in production overhead and were allocated to the garment based on the standard direct labor hours (or dollars) allowed for the production level of that month.

In a company which produces both style garments and standard garments [garments which do not have significant design changes from year to year, i.e. men's dress shirts], the standard garments are allocated a major portion of the design costs even if no design time was spent on that class of garments during the year. While the apparel industry may argue that there is no way to accurately allocate design costs, this researcher will argue that there has to be a better method than the ones currently in use. The design department could allocate all costs for a period across successful or accepted styles and then allocate these costs to the affected divisions and plants. The design department could develop an internal billing system and bill each style for the actual hours spent on a particular style with unsuccessful style costs being eventually absorbed by the successful styles of that year. If a style cost file is maintained over the life of the style, early costs per garment will be high, because fewer garments will be absorbing the design and production start-up costs. As production continues, the cost per garment will drop. As the style reaches the end of its life cycle, the costs per garment will rise due to

increased marketing efforts and, perhaps, increased inventory charges.

Once a review had been made of the literature and the current state of garment costing, the researcher was faced with the task of designing a costing system for CAR using the information obtained and the new knowledge. Based on the information available, Table 1 contains a list of cost centers and cost drivers.

By comparing the standard costing system illustrated in Appendix A and the cost drivers listed in Table 1, one can easily see that more detailed information is available using the idea of cost drivers. To apply all overhead based on direct labor hours or dollars has been compared to spreading peanut butter with a knife. No usage differentiations are made.

For CAR, the costs were divided into four major categories: raw materials, labor, overhead, and finishing costs. During the data gathering phase of this project, CAR was using materials that had been donated to the facility. No material costs were allocated in this project, but we did include material cost allocation in the program. An auxiliary program was written to track material in the warehouse storage area by color lot and to calculate a carrying charge for the piece goods based on how long the material had been in stock and an average rate of return.

The labor costs were obtained from the Foxfire system installed at CAR. Within this system, the labor costs are maintained by cut, by style, and by operator. Our program calculates payroll tax costs based on the actual labor time spent. All labor costs are allocated to the cut level. The cuts may be combined to calculate costs at the style level or divided to obtain costs on the garment level. The cut level was determined to be the basic cost accumulation level. Because the labor force at CAR is paid a salary by Clemson University and their compensation was not tied to use of the Foxfire system, initially there were problems with the system being under-utilized. Production was occurring without using the bar coded cards so that the data was not being captured by the system. This problem was addressed by explaining to the staff the importance to this project of accurate shop floor data and compliance with the system was strengthened.

Overhead costs were obtained from the accounting records of CAR and included utility costs, indirect labor costs, maintenance costs, and other production costs. These costs were manually entered into the system and allocated to the cuts on a proportional basis (total labor time for a cut divided by total labor time for the department). The prorational allocation made based on labor times was not an ideal allocation, but one chosen for CAR based on the ability to capture data. The costing system allocates the overhead for a month to the cut levels; divides this cost into a per garment level; combines this cost into a style level.

COST CENTER	COST DRIVER
Personnel Department	Number of new hires per department
Computer Department	Number of reports per month per department
Repair and Maintenance	Pro-rata allocation to the cut in process at the time of the repair based on the time spent per repair over the total repair hours for the month. Total department expense including fringe benefits for these workers would be allocated this way.
Design Costs	Allocated to successful styles and/or styles with design changes
Purchasing Department	Allocate to each purchase order based on the complexity of each purchase order. Purchasing costs would become a part of the piece goods cost.
Utilities	Based on square footage of a department and allocated to cuts produced within the department during the month; or, based on approximate usage determined by the amount of equipment within a particular department and then allocated to the cuts.
Fringe Benefits	Based on direct labor dollars for a sewing department; allocated to the cuts worked on during the month.
Depreciation	Building - based on square footage occupied by department then allocated to the cut level. Equipment - based on usage during the month which may be approximated by using direct labor hours.
Insurance	Building - based on square footage occupied by department then allocated to the cut level. Equipment - based on location, allocated to departments then to cuts.
Indirect Labor (supervision)	Allocate to departments based on number of employees within department. Allocate to the cut level within each department.

1 Table 1: Cost Centers and Cost Drivers

The equipment at CAR is costly, state of the art, apparel manufacturing equipment. The depreciation on this equipment is high and most of the overhead being allocated represents the depreciation of the production machinery. For this project, the machinery is being depreciated over its useful life under the straight-line depreciation method. This method was chosen to try to reflect the actual usage of the equipment. The useful lives were determined by discussions with CAR personnel and were based on actual or estimated lives or actual or estimated obsolescence based on improvements in technology.

The depreciation included in overhead in the actual companies visited was based on the modified accelerated cost recovery system (MACRS) which is a depreciation method defined under the Internal Revenue Code of 1986 as amended. This depreciation method does not reflect the actual estimated lives of the equipment. Rather, most of the equipment would fall into the seven year or less categories. MACRS depreciation yields a maximum write-off over a short time period to decrease the income tax liability of a company. The cost per garment of the equipment is increased above the true cost of the equipment based on its useful life. Theoretically, if MACRS is being used, the depreciation charges should be decreased by the amount of the tax savings generated to yield a true equipment cost.

Once the research began, rethinking costing was not difficult. All preconceived ideas had to be temporarily forgotten and new thought patterns had to be developed. During the course of the research into this project, the researcher determined that activity based costing is applicable to the apparel industry. The barriers to its adoption are self-imposed barriers of fear of change, fear of discovering a product's true cost, fear of losing customers, and fear of being a first-adopter. An additional barrier is the upfront work involved in determining the cost drivers of a particular company and the time involved in developing an appropriate system. Applying activity-based costing is not an easy solution and is not a final solution to understanding product costs. Useful insights on a company may be obtained by rethinking the costing of products.

The researcher is aware of a major adoption of activity based costing and management by the Kellwood Company based in St. Louis. The company started with a pilot project in one division and has been so pleased with the information obtained and the results that the project has been expanded to other divisions. The results of the pilot project have allowed Kellwood to change production strategies and pricing to their customers. Other companies may have adopted activity based costing and management on a smaller scale, but the researcher is unaware of any other current projects.

CONCLUSIONS

Throughout the course of this project and since its conclusion, the researcher has been actively trying to educate the members of industry to the ideas of new costing methodologies. The researcher has taught Garment Costing for the Fundamentals of Apparel course offered by CAR. In addition to these programs, a summary of the research was presented to the American Apparel Manufacturers Association Financial Management Committee in May 1991.

In an article in Management Accounting, Thornton Parker and Theodore Lettes describe accounting barriers to adoption of flexible computer-integrated manufacturing by small companies. The arguments presented in the paper are powerful and apply, this researcher feels, to the apparel industry. The problems of costing for an industry which sells to both the government and the private sector are summarized:

> "What sort of negotiations and subsequent audit can lead to a fair distribution of costs among products made in the same plant for the government and for private sector customers? If it is hard for a company to estimate its costs for its own purposes, how will it ever be able to reach agreement on the cost of sales to the government? We don't have easy answers. But if industry and government together do nothing, the industrial base so necessary for U.S. defense purposes will be irrevocably hurt. This is a national problem, requiring answers from government, industry, and accounting - not necessarily in that order." [11]

Under current costing practices some styles are subsidizing other styles. If the apparel industry switches to activity based costing, the prices charged the government will change. For standard production items with few style changes and long production runs, the costs should decline. For specialty items with many samples and some style changes, the price should rise. Under the suggested costing techniques, the government would be able to ascertain that it is paying a fair price for the product it is purchasing.

ENDNOTES

1. Drucker, Peter E., "The Emerging Theory of Manufacturing," Harvard Business Review, Reprint from May-June 1990, No. 3.

2. McNair, C. J., CMA, Richard L. Lynch, and Kelvin F. Cross, "Do Financial and Nonfinancial Performance Measures Have to Agree?", Management Accounting, Vol. LXXII, No. 5, November 1990, pp. 28 - 36.

3. Callan, John P., Wesley N. Tredup, and Randy S. Wissinger, CMA, "Elgin Sweeper Company's Journey Toward Cost Management," Management Accounting, Vol. LXXIII, No. 1, July 1991, pp. 24 - 27.

4. Biggs, Joseph R., Ellen J. Long, and Karl E. Fraedrich, "Integrating Accounting, Planning, and Control," Journal of Cost Management for the Manufacturing Industry, Vol, 5, No. 1, Spring 1991, pp. 11 - 21.

5. Plossl, George W., "Prerequisites to Meeting America's Challenge," APICS - The Performance Advantage, July 1991, pp. 22 - 25.

6. Hasty, Susan E., "World Class Manufacturing," Apparel Industry Magazine, Vol. 52, No. 2, February 1991, pp. 22 - 24.

7. Roehm, Harper A., Donald I. Klein, and Joseph F. Castellano, "Springing to World-Class Manufacturing," Management Accounting, Vol. LXXII, No. 9, March 1991, pp. 40 - 48.

8. Tatikonda, Lakshmi U., CPIM, and Rao J. Tatikonda, CPIM. "Overhead Cost Control - through Allocation or Elimination?" Production and Inventory Management Journal, Vol. 32, No. 1, First Quarter 1991, pp. 37 - 42.

9. Cooper, Robin and Robert S. Kaplan. "Profit Priorities from Activity-Based Costing." Harvard Business Review, May-June 1991, pp. 130 - 135.

10. Haedicke, Jack and David Feil. "In a DOD Environment: Hughes Aircraft Sets The Standard for ABC." Management Accounting, Vol. LXXII, No. 8, February 1991, pp. 29 - 33.

11. Parker, Thornton and Theodore Lettes. "Is Accounting Standing In The Way of Flexible Computer-Integrated Manufacturing?" Management Accounting, Vol. LXXII, No. 7, January 1991, pages 36 - 38. [Quote from page 38]

Appendix A

GARMENT COSTING

FUNDAMENTALS OF APPAREL MANUFACTURING

by

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One of the most important aspects of any business is the determination of profit. "How much money did we make this month?" is a frequently asked question in any business. To accurately determine the costs on a per product basis in a timely manner, companies use the techniques of cost accounting. Generally accepted accounting principles (GAAP) require the allocation of overhead expenses between goods sold and goods remaining in inventory (direct or variable costing is a non-GAAP method). The tax regulations are in agreement with the GAAP requirements so, until the rules are changed, allocation must be considered.

Standard costing was developed during the Industrial Revolution (mid-1800's to early 1900's) by industrial engineers who were interested in obtaining accurate product costs in a timely manner to be used for actual shop floor and production control. The current practice within the apparel industry is using standard costing with overhead being allocated on the basis of direct labor hours (usually sewing hours). This section of Fundamentals of Apparel will give an example of standard costing using estimates. The final garment cost is an approximation of the true garment cost for a man's dress shirt.

The costing figures given in this section have been developed to illustrate the costing procedures used in the apparel industry. Although the actual numbers are estimates, the final garment cost approximates the true garment cost for a man's dress shirt.

The first step in the costing process is to develop an operating budget. The standard costs for a period will be based on the operating budget calculated for a given production level. When the basic operating costs change or the production level significantly changes, the standard costs need to be recalculated.

Let's first calculate the earned hours per year for our company in both the cutting department and the sewing department.

	CUTTING	SEWING
number of employees	2	45
times hours per day	x 8	x 8
hours per day	16	360
times 90 % activity level	x 90 %	x 90 %
	14.40	324
times 85 % efficiency level	x 85 %	x 85 %
earned hours per day	12.24	275.4
times 5 days per week	x 5	x 5
times 49 work weeks per year	x 49	x 49
total earned hours per year	2,999	67,473

The overhead costs for each of these production departments will be absorbed or spread over these earned labor hours. The next step will be to develop the operating budget for each of these departments and then to develop the overhead application rate.

OPERATING BUDGET
OVERHEAD COSTS

	CUTTING	SEWING
Indirect labor	12,000	24,000
Vacation & holiday pay	2,077	35,100
Payroll taxes	5,520	72,726
Group insurance	1,440	18,972
Workers' compensation	248	2,530
Depreciation - building	14,000	28,000
Depreciation - equipment	62,300	413,129
Repairs and maintenance	4,608	77,875
Utilities	24,000	72,000
Telephone	1,200	3,600
Supplies	3,000	27,000
Insurance - property	3,600	6,084
Total overhead	133,993	781,016

The overhead will be assigned to garments on the basis of the direct labor costs per garment. The earned labor hours are converted into earned labor dollars using actual wage rates and schedules. For the purposes of this example the cutting room earned hours of 2,999 are multiplied by an average wage rate of $ 8.65 to yield total labor dollars of $ 25,941.35 for the cutting department. A similar calculation is performed for the sewing department using the earned sewing labor hours and an average wage of $ 6.50 yielding total labor dollars of $ 438,574.50 for the sewing department.

The absorption or overhead application rates are calculated by dividing the total overhead for each department by the total labor dollars for that department. The results for our hypothetical company are 517 % for the cutting department and 178 % for the sewing department. Once we know the labor content of the garment, we can calculate the overhead by multiplying the labor dollars by the overhead rate. As the direct labor content in a garment diminishes, the overhead application rate increases so that the application rates become more meaningless. At first glance one would assume that a reduction in labor content would always make a garment cost less, but, due to the allocation processes being used, labor reduction has the potential to make a garment more costly.

The next step is completing an operation bulletin for a particular style. The production steps for the garment are

listed with the standard allowed minutes (SAM), base rate, and standard cost for the operation. The operation bulletin is the production detail and the labor cost detail for the garment. To illustrate the costing process, let's look at the first operation on the attached operation bulletin (Figure 1).

The run collar operation takes .2896 SAM's by an operator whose base rate of pay is $ 6.00 per hour. The standard cost per piece is calculated by:

$$.2896 \text{ SAM} \quad X \quad \frac{(\$\ 6.00\ /hr)}{(\ 60\ min/hr)} \quad = \quad \$\ .0290$$

The standard labor cost for each operation in a garment is calculated by this method. On the second page of Figure 1, we find total SAM's of 15.3863 per shirt at a cost of $ 1.6446.

Figure 1

Clemson Apparel Research
Operation Bulletin
Dress Shirt

Operation	SAM	BASE RATE (per hour)	STD-COST (per piece)
Collar			
Run collar	.2896	6.00	0.0290
Turn form & top stitch collar	.4000	6.00	0.0400
Railroad collar	.2809	6.50	0.0304
BH collar points	.1440	6.00	0.0144
Bandstitch	.2703	6.00	0.0270
BH band	.0690	6.00	0.0069
BS band	.0521	6.00	0.0052
Buck press collar	.2470	5.50	0.0226
Bands			
Bandcrease	.2491	6.00	0.0249
Cuffs			
Line cuff	.1060	5.50	0.0097
Run cuff	.2752	6.50	0.0298
Turn & press cuff	.2564	5.50	0.0235
Topstitch	.2965	6.50	0.0321
Railroad cuff	.2775	6.50	0.0301
BH/BS cuff	.2075	6.00	0.0208
Sleeves			
Sleeve face	.4082	6.50	0.0442
Sleeve block	.4188	6.00	0.0419
BH/BS placket	.3461	6.00	0.0346
Yokes			
Run split yoke	.2371	6.50	0.0257
Press split yoke	.1991	5.50	0.0183
Label sew yoke	.1718	6.00	0.0172
Backs			
Run loop Folder	.0211	6.00	0.0021
Yoke box pleat	.6611	6.50	0.0716

Pockets			
V-top hem	.2278	6.50	0.0247
Fronts			
Run centerplait	.0891	6.00	0.0089
Hem right front	.1184	6.00	0.0118
Set pocket round	.2965	6.50	0.0321
BH/BS front	.5116	6.00	0.0512
Module Assembly			
Folder shoulder join	.5333	6.50	0.0578
Set collar	.6522	7.00	0.0761
Sleeve join	.7373	7.00	0.0860
Sleeve finish	.6460	6.50	0.0700
French fell I	.9022	7.00	0.1053
French fell II	1.0640	7.00	0.1241
Set cuff	.7825	7.00	0.0913
Bottom hem	.5496	7.00	0.0641
Button sew ivy	.1808	6.00	0.0181
Finishing			
Press	.4210	6.00	0.0421
Prepare	.9090	6.00	0.0909
Fold	.8807	6.00	0.0881
Totals	15.3863		1.6446

The final step in costing a garment is constructing a cost sheet. A cost sheet gives the total garment cost by material (piece goods and trim), labor and overhead. The cost sheet attached as Figure 2 is calculated per dozen shirts as is common within the apparel industry. On the last line the cost of a single shirt is given. The shirt's cost may be broken down as follows (on a per dozen basis):

	cost	%
material	89.8950	59.31
labor	20.8369	13.75
overhead	40.8245	26.94
total	151.5564	100.00

Once the shirt is completed the retail price will be calculated. The keystone markup method is employed; the production price of $ 12.63 is multiplied by 2 to obtain the retail price of $ 25.26. This markup must cover the profit to be made by the retailer and all of the retailer's costs.

Even though our costs were approximations, the costing process is the same process followed within the apparel industry. The costs are based on the labor analysis made by the engineering department. Many companies use the engineering department, not the accounting department, to figure the costs sheets for the garments. For product costing to be accurate, the engineers and the accountants must have a good working relationship and both must have a thorough understanding of the production process.

FIGURE 2

COST SHEET

PIECE GOODS	YDS/DOZ.	$/YD.	COST/DOZ.	TOTAL
PINPOINT	22	4.00	$ 88.00	
FREIGHT		.0125	.2750	$88.2750

TRIM	UNIT PRICE	COST/DOZ.	TOTAL
SEWING TRIM	.0850	1.02	1.0200
FINISHING TRIM	.0500	.60	.6000

LABOR & OVERHEAD	DL/DOZ.	OVERHEAD	TOTAL
CUTTING	1.1017	5.6958	6.7975 SEWING &
FINISHING	19.7352	35.1287	54.8639

TOTAL MANUFACTURING COST PER DOZEN	$151.5564
TOTAL COST PER SHIRT	12.6297

PROGRAM INSTRUCTIONS

INSTRUCTIONS ON USING CONVERT

Shardul Divatia

May 7, 1991

1. Quit from the Foxfire program by saying "q" and saying "no" to all the questions asked.

2. You will come to the main menu. From here select the exit to DOS option and you will go to the DOS prompt.

3. Go to the C drive.

4. Go to a directory called OLDLOG (The file name may be OLDLOGS. Try both names as I don't remember whether there is an S at the end or not).

5. All the files that deal with the pay should be in this directory.

6. The files are named Lmmddyy.fil.

7. Copy the files you want to the floppies by following the instructions below.

8. If you type in *'dirmagic'* at the prompt, you should get a list of all the files in the directory. You need to mark all the files and then copy the marked files to the floppy disks.

   (a) Mark all the files you want to copy by placing a '+' symbol by the selected file. Use the '+' symbol on the numeric keypad.
   (b) Then invoke the copy function by choosing the appropriate function key. There is a list of the functions in the right hand corner of the screen.
   (c) The copy function will ask you where you want the files copied. If you have a 5 ¼ " drive you answer a: ; if you have a 3 ½ " drive, you answer b: .
   (d) It will copy all the files to the floppy. As it copies all the files, the copied files will be marked with an "*".
   (e) If it cannot copy all the files onto the floppy, it will quit by saying that there is insufficient disk space.
   (f) When it does this, you simply insert a new floppy and invoke the copy function again. Now it will not copy the files with a "*" beside them. It will only copy the files with an arrow beside them.
   (g) This method allows you to copy all the files without worrying about the files copied and the files uncopied.
   (h) If the *'dirmagic'* command does not work on the PC, then you have to manually copy all the files by saying *'copy Lmmddyy.fil a: '*or *'copy Lmmddyy.fil b:'*. A way to make this easier is to do a directory command on the

directory, print the directory using a screen printout, and mark the files as you copy them.

To use Convert, please follow the instructions below.

1. Make sure that the file names are in the proper format, ie. Lmmddyy.fil. The case of the 'l' is unimportant, but any other format of the mmddyy is a problem. If the file name is in the incorrect format, rename by typing *"rename lmm-dd-yy.fil lmmddyy.fil"*.

2. Invoke Convert by typing *'convert'*.

3. It will ask you for an input file name. Enter the filename.

4. If the filename does not exist, it will prompt you and ask for another filename.

5. The program will do the conversion and prompt you to continue or quit.

6. If you are working on floppy disk, then the resulting file is placed on that disk. Make sure that you copy the converted file to any other disk that you plan to work on. Each month has 20 to 25 files for the month and cannot be fitted on one disk. This program strips all those files and writes the output to one monthly file. It is imperative that you make sure that the monthly file is on the disk you will be using to run the program.

MANUAL FOR THE COST ESTIMATION PROGRAM

Shardul Divatia
May 5, 1991

The first screen gives you three options:

1. IF YOU WANT TO ENTER DATA ENTER 1

2. IF YOU WANT REPORT BY CUTS ENTER 2

3. IF YOU WANT REPORT BY STYLE ENTER 3

If you want to exit the program at this stage, enter 'q' and you will be returned to the DOS prompt.

The enter data section of the program is password protected. If you want to enter data, you must know the password. The program will prompt you for a password as soon as you enter the data option. Once you enter the program, a menu will appear.

1. ENTER SEWING DEPARTMENT INFORMATION

2. ENTER EQUIPMENT INFORMATION

3. ENTER PAYROLL TAX RATES AND LIMITS

1. The first option allows you to create accounts for the costs that are associated with the apparel plant. You begin by entering the date. Next you enter the account number. If that number does not exist, the program prompts you and gives you the option of creating a new account. If the account already exits, the program echos back the name of the account in the account name space. You then enter the costs incurred for that account for the month. After you have finished entering the amount for this account, the program will ask you if you want to enter another transaction. If you do not wish to enter another account, the program will ask if you want to see and verify the accounts and costs which you entered. If you choose to go to the verification screen, the program will allow you to interactively correct any amount that you have entered incorrectly and will correct the total as you correct the individual accounts. When you exit from the verification screen, the amounts are saved. If you chose not to verify your amounts, the amounts were saved when you exited the enter segment of the program.

2. The second option allows you to look at the equipment that is present in the plant and the cost of each machine. There are two suboptions to this screen.

   (a) ENTER NEW MACHINES
   (b) VIEW MACHINES

   (a) If there are new machines which have been placed into production, you enter the cost of the machine and the useful life of the machine. The life of the machine determines that amount of depreciation included in the costing program.
   (b) If you wish to view the existing machinery list, option two will allow you to scroll through the current list by using the up and down arrow keys.

3. The third option allows you to enter the tax rates used for the program. These rates are used to incorporate the employer's share of the payroll taxes. The taxes are computed based on gross wages of the employees. You

enter the rate in a percentage form and the program automatically converts it to the decimal form while calculating the taxes.

The second and third options on the first screen are the same as to the screens they display. In Option 2 from the main menu, the costs are displayed per individual cut. While in Option 3 from the main menu, the costs are displayed per style.

When you enter either of the display options and if you have not entered the tax rates, the program will ask you if you want to continue without the tax rates or if you want to quit. In the final screen, the program displays the cut/style numbers available. To choose a cut or style, move the cursor to the right hand side of the cut or style you are choosing and enter an 'x'. The program will display the total costs for that cut or style and will ask you if you would like to see detailed information on the total cost. The detailed cost display screen contains a print option. To print you enter 'p' and the program will print the cost details. After printing you will be returned to the previous screen (all cuts or styles listed). From this screen you may continue or you may exit.

NOTES

1. The date is entered as mmdd19yy on all the screens. If not entered in this format, the program will not accept the date and will prompt you for another date.

2. The cost amount may be entered in three ways:

   (a) You entered the number as dollars and cents. You will have entered the number as 100.00.

   (b) If you enter the number without a period, the program will divide the entered number by 100 and place the resulting amount on the screen.

   (c) If you enter the number with a period at the end of the number, the program will take that amount as whole dollars and add 00 cents and will place the resulting number on the screen.

3. Hitting escape from any screen will take you backwards one level without saving the data you have just entered.

4. Typing 'q' to exit will save the data and then exit this segment of the program.

THIS IS THE MAIN MENU

IF YOU WANT TO ENTER DATA ENTER 1

IF YOU WANT REPORT BY CUTS ENTER 2

IF YOU WANT REPORT BY STYLE ENTER 3

ENTER YOU SELECTION.....
TO QUIT ENTER Q.....

PRINTOUTS OF THE CAR COSTING SYSTEM

COST SHEETS FOR CUTS APRIL 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	721.48	
Overhead		
--depreciation	7265.84	
--other	4973.15	
--management		
Carrying costs during production		
Total Manufacturing Costs	12960.47	
Finishing costs -- boxing	75.00	
-- freight		
TOTAL COSTS FOR CUT	001137	13035.47
# of Garments in This Cut	224	
Total Cost Per Garment	58.19	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	2030.06	
Overhead		
--depreciation	20444.14	
--other	13993.14	
--management		
Carrying costs during production		
Total Manufacturing Costs	36467.34	
Finishing costs -- boxing	65.00	
-- freight		
TOTAL COSTS FOR CUT	001138	36532.34
# of Garments in This Cut	181	
Total Cost Per Garment	201.84	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	186.71	
Overhead		
--depreciation	1880.27	
--other	1286.97	
--management		
Carrying costs during production		
Total Manufacturing Costs	3353.95	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	0011EE	3373.95
# of Garments in This Cut	48	
Total Cost Per Garment	70.29	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	996.78	
Overhead		
--depreciation	10038.28	
--other	6870.77	
--management		
Carrying costs during production		
Total Manufacturing Costs	17905.83	
Finishing costs -- boxing	85.00	
-- freight		
TOTAL COSTS FOR CUT	100001	17990.83
# of Garments in This Cut	244	
Total Cost Per Garment	73.73	
Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	146.01	
Overhead		
--depreciation	1470.39	
--other	1006.42	
--management		
Carrying costs during production		
Total Manufacturing Costs	2622.81	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	1000EE	2642.81
# of Garments in This Cut	48	
Total Cost Per Garment	55.06	
Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	146.01	
Overhead		
--depreciation	1470.39	
--other	1006.42	
--management		
Carrying costs during production		
Total Manufacturing Costs	2622.81	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	1000EE	2642.81
# of Garments in This Cut	48	
Total Cost Per Garment	55.06	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	157.02	
Overhead		
--depreciation	1581.31	
--other	1082.34	
--management		
Carrying costs during production		
Total Manufacturing Costs	2820.67	
Finishing costs -- boxing	50.00	
-- freight		
TOTAL COSTS FOR CUT	100002	2870.67
# of Garments in This Cut	144	
Total Cost Per Garment	19.94	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	135.43	
Overhead		
--depreciation	1363.88	
--other	933.52	
--management		
Carrying costs during production		
Total Manufacturing Costs	2432.82	
Finishing costs -- boxing	35.00	
-- freight		
TOTAL COSTS FOR CUT	001139	2467.82
# of Garments in This Cut	96	
Total Cost Per Garment	25.71	

COST SHEETS FOR CUTS MAY 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	936.39	
Overhead		
--depreciation	6499.33	
--other	3444.51	
--management		
Carrying costs during production		
Total Manufacturing Costs	10880.23	
Finishing costs -- boxing	85.00	
-- freight		
TOTAL COSTS FOR CUT	100001	10965.23
# of Garments in This Cut	244	
Total Cost Per Garment	44.94	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	91.23	
Overhead		
--depreciation	633.22	
--other	336.23	
--management		
Carrying costs during production		
Total Manufacturing Costs	1060.69	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	1000EE	1080.69
# of Garments in This Cut	48	
Total Cost Per Garment	22.51	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	599.61	
Overhead		
--depreciation	4161.83	
--other	2204.31	
--management		
Carrying costs during production		
Total Manufacturing Costs	6965.76	
Finishing costs -- boxing	60.00	
-- freight		
TOTAL COSTS FOR CUT	001138	7025.76
# of Garments in This Cut	167	
Total Cost Per Garment	42.07	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	116.58	
Overhead		
--depreciation	809.15	
--other	429.77	
--management		
Carrying costs during production		
Total Manufacturing Costs	1355.49	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	0011EE	1375.49
# of Garments in This Cut	48	
Total Cost Per Garment	28.66	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	1648.94	
Overhead		
--depreciation	11445.09	
--other	6070.44	
--management		
Carrying costs during production		
Total Manufacturing Costs	19164.48	
Finishing costs -- boxing	85.00	
-- freight		
TOTAL COSTS FOR CUT	001139	19249.48
# of Garments in This Cut	247	
Total Cost Per Garment	77.93	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	106.47	
Overhead		
--depreciation	739.03	
--other	391.72	
--management		
Carrying costs during production		
Total Manufacturing Costs	1237.22	
Finishing costs -- boxing	40.00	
-- freight		
TOTAL COSTS FOR CUT	100002	1277.22
# of Garments in This Cut	106	
Total Cost Per Garment	12.05	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	2810.04	
Overhead		
--depreciation	19504.15	
--other	10299.19	
--management		
Carrying costs during production		
Total Manufacturing Costs	32613.38	
Finishing costs -- boxing	80.00	
-- freight		
TOTAL COSTS FOR CUT	001140	32693.38
# of Garments in This Cut	233	
Total Cost Per Garment	140.31	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	26.87	
Overhead		
--depreciation	186.53	
--other	98.77	
--management		
Carrying costs during production		
Total Manufacturing Costs	312.17	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001141	332.17
# of Garments in This Cut	48	
Total Cost Per Garment	6.92	
Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	18.26	
Overhead		
--depreciation	126.76	
--other	67.43	
--management		
Carrying costs during production		
Total Manufacturing Costs	212.45	
Finishing costs -- boxing	395.00	
-- freight		
TOTAL COSTS FOR CUT	500000	607.45
# of Garments in This Cut	1176	
Total Cost Per Garment	0.52	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	-0.00	
Labor	-3.54	
Overhead		
--depreciation	-24.54	
--other	-13.05	
--management		
Carrying costs during production		
Total Manufacturing Costs	-41.13	
Finishing costs -- boxing	8155.00	
-- freight		
TOTAL COSTS FOR CUT	740000	8113.87
# of Garments in This Cut	24464	
Total Cost Per Garment	0.33	

Raw Material Costs		0.00
Carrying Costs in Raw Materials		-0.00
Labor		-2.57
Overhead		
--depreciation		-17.85
--other		-9.50
--management		
Carrying costs during production		
Total Manufacturing Costs		-29.92
Finishing costs -- boxing		-4505.00
-- freight		
TOTAL COSTS FOR CUT	440000	-4534.92
# of Garments in This Cut	-13536	-4505.00
Total Cost Per Garment		0.34

Raw Material Costs	0.00
Carrying Costs in Raw Materials	-0.00
Labor	-2.41
Overhead	
--depreciation	-16.70
--other	-8.88
--management	
Carrying costs during production	
Total Manufacturing Costs	-27.98
Finishing costs -- boxing	-3505.00
-- freight	
TOTAL COSTS FOR CUT	340000 -3532.98
# of Garments in This Cut	-10536-3505.00
Total Cost Per Garment	0.34
Raw Material Costs	0.00
Carrying Costs in Raw Materials	-0.00
Labor	-0.27
Overhead	
--depreciation	-1.89
--other	-1.00
--management	
Carrying costs during production	
Total Manufacturing Costs	-3.17
Finishing costs -- boxing	-6505.00
-- freight	
TOTAL COSTS FOR CUT	950000 -6508.17
# of Garments in This Cut	-19536-6505.00
Total Cost Per Garment	0.33

COST SHEETS FOR CUTS JUNE 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	2232.00	
Overhead		
--depreciation	11934.11	
--other	4249.20	
--management		
Carrying costs during production		
Total Manufacturing Costs	18415.32	
Finishing costs -- boxing	85.00	
-- freight		
TOTAL COSTS FOR CUT	001139	18500.32
# of Garments in This Cut	247	
Total Cost Per Garment	74.90	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	1315.14	
Overhead		
--depreciation	7031.82	
--other	2503.13	
--management		
Carrying costs during production		
Total Manufacturing Costs	10850.09	
Finishing costs -- boxing	90.00	
-- freight		
TOTAL COSTS FOR CUT	100001	10940.09
# of Garments in This Cut	264	
Total Cost Per Garment	41.44	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	271.57	
Overhead		
--depreciation	1452.05	
--other	517.97	
--management		
Carrying costs during production		
Total Manufacturing Costs	2241.59	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	0011EE	2261.59
# of Garments in This Cut	48	
Total Cost Per Garment	47.12	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	2821.92	
Overhead		
--depreciation	15088.32	
--other	5334.76	
--management		
Carrying costs during production		
Total Manufacturing Costs	23245.00	
Finishing costs -- boxing	80.00	
-- freight		
TOTAL COSTS FOR CUT	001140	23325.00
# of Garments in This Cut	233	
Total Cost Per Garment	100.11	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	26.87	
Overhead		
--depreciation	143.69	
--other	50.95	
--management		
Carrying costs during production		
Total Manufacturing Costs	221.52	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001141	241.52
# of Garments in This Cut	48	
Total Cost Per Garment	5.03	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	18.26	
Overhead		
--depreciation	97.65	
--other	35.04	
--management		
Carrying costs during production		
Total Manufacturing Costs	150.95	
Finishing costs -- boxing	395.00	
-- freight		
TOTAL COSTS FOR CUT	500000	545.95
# of Garments in This Cut	1176	
Total Cost Per Garment	0.46	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	-0.00	
Labor	-3.54	
Overhead		
--depreciation	-18.90	
--other	-6.78	
--management		
Carrying costs during production		
Total Manufacturing Costs	-29.22	
Finishing costs -- boxing	8155.00	
-- freight		
TOTAL COSTS FOR CUT	740000	8125.78
# of Garments in This Cut	24464	
Total Cost Per Garment	0.33	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	-0.00	
Labor	-2.57	
Overhead		
--depreciation	-13.75	
--other	-4.93	
--management		
Carrying costs during production		
Total Manufacturing Costs	-21.26	
Finishing costs -- boxing	-4505.00	
-- freight		
TOTAL COSTS FOR CUT	440000	-4526.26
# of Garments in This Cut	-13536	-4505.00
Total Cost Per Garment	0.33	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	362.99	
Overhead		
--depreciation	1940.83	
--other	691.58	
--management		
Carrying costs during production		
Total Manufacturing Costs	2995.40	
Finishing costs -- boxing	40.00	
-- freight		
TOTAL COSTS FOR CUT	100002	3035.40
# of Garments in This Cut	106	
Total Cost Per Garment	28.64	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	1080.20	
Overhead		
--depreciation	5775.64	
--other	2051.78	
--management		
Carrying costs during production		
Total Manufacturing Costs	8907.62	
Finishing costs -- boxing	65.00	
-- freight		
TOTAL COSTS FOR CUT	001138	8972.62
# of Garments in This Cut	181	
Total Cost Per Garment	49.57	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	117.26	
Overhead		
--depreciation	626.97	
--other	223.76	
--management		
Carrying costs during production		
Total Manufacturing Costs	968.00	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	1000EE	988.00
# of Garments in This Cut	48	
Total Cost Per Garment	20.58	

COST SHEETS FOR CUTS JULY 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	57.84	
Overhead		
--depreciation	623.66	
--other	194.29	
--management		
Carrying costs during production		
Total Manufacturing Costs	875.79	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001143	895.79
# of Garments in This Cut	48	
Total Cost Per Garment	18.66	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	512.18	
Overhead		
--depreciation	5522.80	
--other	1721.11	
--management		
Carrying costs during production		
Total Manufacturing Costs	7756.10	
Finishing costs -- boxing	90.00	
-- freight		
TOTAL COSTS FOR CUT	001142	7846.10
# of Garments in This Cut	264	
Total Cost Per Garment	29.72	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	11.87	
Overhead		
--depreciation	128.02	
--other	39.89	
--management		
Carrying costs during production		
Total Manufacturing Costs	179.78	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001140	199.78
# of Garments in This Cut	48	
Total Cost Per Garment	4.16	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	117.26	
Overhead		
--depreciation	1264.41	
--other	394.67	
--management		
Carrying costs during production		
Total Manufacturing Costs	1776.34	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	1000EE	1796.34
# of Garments in This Cut	48	
Total Cost Per Garment	37.42	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	240.58	
Overhead		
--depreciation	2594.15	
--other	808.29	
--management		
Carrying costs during production		
Total Manufacturing Costs	3643.02	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	0011EE	3663.02
# of Garments in This Cut	48	
Total Cost Per Garment	76.31	

aw Material Costs	0.00	
arrying Costs in Raw Materials	0.00	
abor	704.07	
verhead		
--depreciation	7591.91	
--other	2366.63	
--management		
arrying costs during production		
otal Manufacturing Costs	10662.62	
inishing costs -- boxing	100.00	
-- freight		
OTAL COSTS FOR CUT	001139	10762.62
of Garments in This Cut	288	
Total Cost Per Garment	37.37	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	1080.20	
Overhead		
--depreciation	11647.59	
--other	3627.42	
--management		
Carrying costs during production		
Total Manufacturing Costs	16355.22	
Finishing costs -- boxing	60.00	
-- freight		
TOTAL COSTS FOR CUT	001138	16415.21
# of Garments in This Cut	172	
Total Cost Per Garment	95.44	

Raw Material Costs	0.00		
Carrying Costs in Raw Materials	0.00		
Labor	997.65		
Overhead			
--depreciation	10757.54		
--other	3353.27		
--management			
Carrying costs during production			
Total Manufacturing Costs	15108.46		
Finishing costs -- boxing	75.00		
-- freight			
TOTAL COSTS FOR CUT	100001	15183.46	
# of Garments in This Cut	217		
Total Cost Per Garment	69.97		

Raw Material Costs		0.00	
Carrying Costs in Raw Materials		0.00	
Labor		362.99	
Overhead			
--depreciation		3914.03	
--other		1220.73	
--management			
Carrying costs during production			
Total Manufacturing Costs		5497.75	
Finishing costs -- boxing		50.00	
-- freight			
TOTAL COSTS FOR CUT	100002		5547.75
# of Garments in This Cut		144	
Total Cost Per Garment		38.53	

COST SHEETS FOR CUTS AUGUST 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	512.18	
Overhead		
--depreciation	31094.90	
--other	9629.28	
--management		
Carrying costs during production		
Total Manufacturing Costs	41236.37	
Finishing costs -- boxing	85.00	
-- freight		
TOTAL COSTS FOR CUT	001142	41321.37
# of Garments in This Cut	241	
Total Cost Per Garment	171.46	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	65.93	
Overhead		
--depreciation	4002.90	
--other	1239.48	
--management		
Carrying costs during production		
Total Manufacturing Costs	5308.32	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	0011EE	5328.32
# of Garments in This Cut	48	
Total Cost Per Garment	111.01	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	57.84	
Overhead		
--depreciation	3511.40	
--other	1087.44	
--management		
Carrying costs during production		
Total Manufacturing Costs	4656.68	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001143	4676.68
# of Garments in This Cut	48	
Total Cost Per Garment	97.43	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	16.02	
Overhead		
--depreciation	972.46	
--other	301.11	
--management		
Carrying costs during production		
Total Manufacturing Costs	1289.59	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001147	1309.59
# of Garments in This Cut	48	
Total Cost Per Garment	27.28	

Raw Material Costs		0.00
Carrying Costs in Raw Materials		0.00
Labor		43.91
Overhead		
--depreciation		2665.71
--other		825.48
--management		
Carrying costs during production		
Total Manufacturing Costs		3535.10
Finishing costs -- boxing		35.00
-- freight		
TOTAL COSTS FOR CUT	001148	3570.10
# of Garments in This Cut		96
Total Cost Per Garment		37.19

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	3.34	
Overhead		
--depreciation	202.87	
--other	62.83	
--management		
Carrying costs during production		
Total Manufacturing Costs	269.04	
Finishing costs -- boxing	5.00	
-- freight		
TOTAL COSTS FOR CUT	001149	274.04
# of Garments in This Cut	13	
Total Cost Per Garment	21.08	

Raw Material Costs		0.00
Carrying Costs in Raw Materials		0.00
Labor		26.25
Overhead		
--depreciation		1593.87
--other		493.56
--management		
Carrying costs during production		
Total Manufacturing Costs		2113.69
Finishing costs -- boxing		20.00
-- freight		
TOTAL COSTS FOR CUT	001146	2133.69
# of Garments in This Cut		48
Total Cost Per Garment		44.45

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COST SHEETS FOR CUTS SEPTEMBER 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	9.28	
Overhead		
--depreciation	913.84	
--other	215.49	
--management		
Carrying costs during production		
Total Manufacturing Costs	1138.61	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	100002	1158.61
# of Garments in This Cut	48	
Total Cost Per Garment	24.14	

aw Material Costs	0.00	
arrying Costs in Raw Materials	0.00	
abor	20.38	
verhead		
--depreciation	2006.63	
--other	473.18	
--management		
arrying costs during production		
otal Manufacturing Costs	2500.19	
inishing costs -- boxing	20.00	
-- freight		
OTAL COSTS FOR CUT	001145	2520.19
of Garments in This Cut	48	
Total Cost Per Garment	52.50	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	31.17	
Overhead		
--depreciation	3069.09	
--other	723.65	
--management		
Carrying costs during production		
Total Manufacturing Costs	3823.91	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001144	3843.91
# of Garments in This Cut	48	
Total Cost Per Garment	80.08	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	193.41	
Overhead		
--depreciation	19044.66	
--other	4490.79	
--management		
Carrying costs during production		
Total Manufacturing Costs	23728.86	
Finishing costs -- boxing	50.00	
-- freight		
TOTAL COSTS FOR CUT	001146	23778.86
# of Garments in This Cut	144	
Total Cost Per Garment	165.13	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	3.34	
Overhead		
--depreciation	329.04	
--other	77.59	
--management		
Carrying costs during production		
Total Manufacturing Costs	409.97	
Finishing costs -- boxing	5.00	
-- freight		
TOTAL COSTS FOR CUT	001149	414.97
# of Garments in This Cut	13	
Total Cost Per Garment	31.92	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	82.39	
Overhead		
--depreciation	8112.97	
--other	1913.06	
--management		
Carrying costs during production		
Total Manufacturing Costs	10108.43	
Finishing costs -- boxing	35.00	
-- freight		
TOTAL COSTS FOR CUT	001148	10143.43
# of Garments in This Cut	96	
Total Cost Per Garment	105.66	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	107.32	
Overhead		
--depreciation	10567.88	
--other	2491.99	
--management		
Carrying costs during production		
Total Manufacturing Costs	13167.20	
Finishing costs -- boxing	50.00	
-- freight		
TOTAL COSTS FOR CUT	001147	13217.20
# of Garments in This Cut	144	
Total Cost Per Garment	91.79	

COST SHEETS FOR CUTS OCTOBER 1990

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	31.17	
Overhead		
--depreciation	3837.03	
--other	1212.92	
--management		
Carrying costs during production		
Total Manufacturing Costs	5081.12	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001144	5101.12
# of Garments in This Cut	48	
Total Cost Per Garment	106.27	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	20.38	
Overhead		
--depreciation	2508.72	
--other	793.05	
--management		
Carrying costs during production		
Total Manufacturing Costs	3322.15	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	001145	3342.15
# of Garments in This Cut	48	
Total Cost Per Garment	69.63	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	167.16	
Overhead		
--depreciation	20578.01	
--other	6505.02	
--management		
Carrying costs during production		
Total Manufacturing Costs	27250.19	
Finishing costs -- boxing	50.00	
-- freight		
TOTAL COSTS FOR CUT	001146	27300.19
# of Garments in This Cut	144	
Total Cost Per Garment	189.58	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	91.31	
Overhead		
--depreciation	11240.26	
--other	3553.24	
--management		
Carrying costs during production		
Total Manufacturing Costs	14884.80	
Finishing costs -- boxing	50.00	
-- freight		
TOTAL COSTS FOR CUT	001147	14934.80
# of Garments in This Cut	144	
Total Cost Per Garment	103.71	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	9.28	
Overhead		
--depreciation	1142.50	
--other	361.16	
--management		
Carrying costs during production		
Total Manufacturing Costs	1512.94	
Finishing costs -- boxing	20.00	
-- freight		
TOTAL COSTS FOR CUT	100002	1532.94
# of Garments in This Cut	48	
Total Cost Per Garment	31.94	

Raw Material Costs	0.00	
Carrying Costs in Raw Materials	0.00	
Labor	38.48	
Overhead		
--depreciation	4737.58	
--other	1497.63	
--management		
Carrying costs during production		
Total Manufacturing Costs	6273.70	
Finishing costs -- boxing	35.00	
-- freight		
TOTAL COSTS FOR CUT	001148	6308.70
# of Garments in This Cut	96	
Total Cost Per Garment	65.72	

COST SHEETS FOR CUTS DECEMBER 1990

Raw Material Costs		0.00
Carrying Costs in Raw Materials		0.00
Labor		75.95
Overhead		
--depreciation		4049.32
--other		943.64
--management		
Carrying costs during production		
Total Manufacturing Costs		5068.91
Finishing costs -- boxing		45.00
-- freight		
TOTAL COSTS FOR CUT	001154	5113.91
# of Garments in This Cut		120
Total Cost Per Garment		42.62

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Raw Material Costs		0.00
Carrying Costs in Raw Materials		0.00
Labor		492.61
Overhead		
--depreciation		26264.29
--other		6120.94
--management		
Carrying costs during production		
Total Manufacturing Costs		32877.84
Finishing costs -- boxing		45.00
-- freight		
TOTAL COSTS FOR CUT	001153	32922.84
# of Garments in This Cut		120
Total Cost Per Garment .		274.36

TO QUIT ENTER Q TO PRINT ENTER P

w Material Costs	0.00	
rrying Costs in Raw Materials	0.00	
bor	236.47	
erhead		
--depreciation	12607.60	
--other	2938.21	
--management		
rrying costs during production		
tal Manufacturing Costs	15782.27	
nishing costs -- boxing	50.00	
-- freight		
TAL COSTS FOR CUT	001152	15832.27
of Garments in This Cut	140	
otal Cost Per Garment	113.09	

aw Material Costs		0.00	
arrying Costs in Raw Materials		0.00	
abor		21.06	
verhead			
--depreciation		1122.91	
--other		261.63	
--management			
arrying costs during production			
otal Manufacturing Costs		1405.61	
inishing costs -- boxing		25.00	
-- freight			
OTAL COSTS FOR CUT	001151		1430.61
of Garments in This Cut		72	
otal Cost Per Garment		19.87	

COST SHEETS FOR STYLES APRIL 1990

ıw Material Costs	0.00	
ırrying Costs in Raw Materials	0.00	
ıbor	3073.67	
'erhead		
--depreciation	30954.13	
--other	21186.78	
--management		
ırrying costs during production		
ıtal Manufacturing Costs	55214.56	
nishing costs -- boxing	185.00	
-- freight		
ITAL COSTS FOR STYLE	0001	55399.56
of Garments in This Style	549	
'otal Cost Per Garment	100.91	

w Material Costs	0.00	
rrying Costs in Raw Materials	0.00	
bor	1289.95	
erhead		
--depreciation	12990.75	
--other	8891.61	
--management		
rrying costs during production		
tal Manufacturing Costs	23172.32	
nishing costs -- boxing	150.00	
-- freight		
TAL COSTS FOR STYLE	0002	23322.32
of Garments in This Style	436	
otal Cost Per Garment	53.49	

Material Costs		0.00
rying Costs in Raw Materials		0.00
or		9.85
rhead		
--depreciation		99.23
--other		67.92
--management		
rying costs during production		
al Manufacturing Costs		177.00
ishing costs -- boxing		15.00
-- freight		
AL COSTS FOR STYLE	0003	192.00
f Garments in This Style		43
tal Cost Per Garment		4.47

COST SHEETS FOR STYLES MAY - DECEMBER 1990

w Material Costs	0.00	
rrying Costs in Raw Materials	0.00	
bor	2611.42	
erhead		
--depreciation	42105.84	
--other	14201.09	
--management		
rrying costs during production		
tal Manufacturing Costs	58918.38	
nishing costs -- boxing	130.00	
-- freight		
TAL COSTS FOR STYLE	0002	59048.38
of Garments in This Style	388	
otal Cost Per Garment	152.19	

ıw Material Costs	0.00
ırrying Costs in Raw Materials	0.00
ıbor	8283.51
'erhead	
--depreciation	133561.17
--other	45015.03
--management	
ırrying costs during production	
ɔtal Manufacturing Costs	186859.77
nishing costs -- boxing	560.00
-- freight	
ɔTAL COSTS FOR STYLE	0001 187419.77
of Garments in This Style	1677
'otal Cost Per Garment	111.76

aw Material Costs		0.00
arrying Costs in Raw Materials		0.00
abor		9.85
verhead		
--depreciation		158.87
--other		53.78
--management		
arrying costs during production		
otal Manufacturing Costs		222.50
inishing costs -- boxing		15.00
-- freight		
OTAL COSTS FOR STYLE	0003	237.50
of Garments in This Style		43
Total Cost Per Garment		5.52

aw Material Costs	0.00	
arrying Costs in Raw Materials	0.00	
abor	4.21	
verhead		
--depreciation	67.83	
--other	22.96	
--management		
arrying costs during production		
otal Manufacturing Costs	95.00	
inishing costs -- boxing	3395.00	
-- freight		
OTAL COSTS FOR STYLE	3001	3490.00
of Garments in This Style	10176	
Total Cost Per Garment	0.34	

BIBLIOGRAPHY

Banker, Rajiv D., Srikant M. Datar, and Sunder Kekre. "Relevant Costs, Congestion, and Stochasticity in Production Environments." unpublished working paper, Carnegie-Mellon University, August 1986.

Beaujon, George J. and Vinod R. Singhal. "Understanding the Activity Costs in an Activity-Based Cost System." Journal of Cost Management for the Manufacturing Industry, Vol. 4, no. 1, Spring 1990, pp. 51 - 72.

Bennett, Earl D., Sarah A. Reed, and Ted Simmonds. "Learning From A CIM Experience." Management Accounting, Vol. LXXIII, No. 1, July 1991, pp. 28 - 33.

Biggs, Joseph R., Ellen J. Long, and Karl E. Fraedrich. "Integrating Accounting, Planning, and Control." Journal of Cost Management for the Manufacturing Industry, Vol. 5, No. 1 Spring 1991, pp. 11 - 21.

Borden, James P. "Review of Literature on Activity-Based Costing." Journal of Cost Management for the Manufacturing Industry, Vol. 4, no. 1, Spring 1990, pp. 5 - 13.

Brimson, James A. and Leonard D. Frescoln. "Technology Accounting - The Value-Added Approach to Capital Asset Depreciation." CIM Review, Vol. 3, No. 1, Fall 1986, pp. 44 - 52.

Bonsack, Robert A. "Cost Management Practice: Does Activity-Based Costing Replace Standard Costing?" Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 46 - 47.

Byrum, Donald A. J. "The Right Way to Control Period Expense." Management Accounting, Vol. LXXII, No. 3, September 1990, pp. 55 - 59.

Callan, John P., Wesley N. Tredup, and Randy S. Wissinger, CMA. "Elgin Sweeper Company's Journey Toward Cost Management." Management Accounting, Vol. LXXIII, No. 1, July 1991, pp. 24 - 27.

Campbell, Robert J., Michael Janson, and James Bush. "Developing Strategic Cost Standards in a Machine-Paced Environment." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 18 - 28.

Campi, John P. "Executive Briefing: Corporate Mindset: Strategic Advantage or Fatal Vision." Journal of Cost

Management for the Manufacturing Industry, Vol. 5, No. 1 Spring 1991, pp. 53 - 57.

Cheatham, Carole. "Updating Standard Cost Systems." Journal of Accountancy, Vol. 170, No. 6, December 1990, pp. 57 - 62.

Chen, Rosita S. and Sheng-Der Pan. "Frederick W. Taylor and The Evolution of Standard Overhead Costing." Working Paper No. 42, The Academy of Accounting Historians' Working Paper Series, Vol. 3, 1984, pp. 14 - 27.

Chenhall, Robert H. and Deigan Morris. "The Impact of Structure, Environment, and Interdependence on the Perceived Usefulness of Management Accounting Systems." The Accounting Review, Vol. LXI, No. 1, January 1986,pp.16-35.

Chua, Wai Fong. "Radical Developments in Accounting Thought." The Accounting Review, Vol. LXI, No. 4, October 1986, pp. 601 - 632.

Clausing, Neal. "Cost Management Practice: 'But What's My Cost?'" Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 3, Fall 1990, pp. 52 - 56.

Cooper, Robin. "Cost Management Concepts and Principles: The Two-Stage Procedure in Cost Accounting - Part Two." Journal of Cost Management for the Manufacturing Industries, Vol. 1, No. 3, Fall 1987, pp. 39 - 45.

Cooper, Robin. "The Rise of Activity-Based Costing - Part One: What Is an Activity-Based Cost System?" Journal of Cost Management for the Manufacturing Industry, Vol. 2, No. 2, Summer 1988, pp. 45 - 54.

Cooper, Robin. "Cost Management Concepts and Principles: The Rise of Activity-Based Costing - Part Two: When Do I Need an Activity-Based Cost System?" Journal of Cost Management for the Manufacturing Industries, Vol. 2, No. 3, Fall 1988, pp. 41 - 48.

Cooper, Robin. Cost Management Concepts and Principles: The Rise of Activity-Based Costing - Part Three: How Many Cost Drivers Do You Need, and How Do You Select Them?" Journal of Cost Management for the Manufacturing Industries, Vol. 2, No. 4, Winter 1989, pp. 34 - 46.

Cooper, Robin. "Cost Management Concepts and Principles: The Rise of Activity-Based Costing - Part Four: What Do Activity-Based Cost Systems Look Like?" Journal of Cost Management for the Manufacturing Industries, Vol. 3, No. 1, Spring 1989, pp. 38 - 49.

Cooper, Robin. "Implementing an Activity-Based Cost System." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 1, Spring 1990, pp. 33 - 42.

Cooper, Robin. "Cost Classification in Unit-Based and Activity-Based Manufacturing Cost Systems." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 3, Fall 1990, pp. 4 - 14.

Cooper, Robin and Robert S. Kaplan. "Profit Priorities from Activity-Based Costing." Harvard Business Review, May-June 1991, pp. 130 - 135.

Czyzewski, Alan B. and Rita P. Hull. "Improving Profitability With Life Cycle Costing." Journal of Cost Management for the Manufacturing Industry, Vol. 5, No. 2, Summer 1991, pp. 20 - 27.

Damon, William W. and Richard Schramm. "A Simultaneous Decision Model for Production, Marketing and Finance." Management Science, Vol. 19, No. 2, October 1972, pp. 161 - 172.

DeWelt, R. L. "Integrating Cost Accounting with Inventory Control and MRP." Inventory Management Reprints, APICS, 1986, pp. 248 - 257.

Dolinsky, Larry R. and Thomas E. Vollmann. "Transaction-Based Overhead Considerations for Product Design." Journal of Cost Management for the Manufacturing Industry, Vol. 5, No. 2, Summer 1991, pp. 7 - 19.

Drucker, Peter E. "The Emerging Theory of Manufacturing." Harvard Business Review, Reprint from May-June 1990, No. 3.

Edersheim, Elizabeth Haas and Betty Vandenbosch. "How to Make Accounting Count: Causal-Based Accounting." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 5 - 17.

Emore, James R. and Joseph A. Ness. "The Slow Pace of Meaningful Change in Cost Systems." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 36 - 45.

Ferrara, William L. "The New Cost/Management Accounting - More Questions Than Answers." Management Accounting, Vol. LXXII, No. 4, October 1990, pp. 48 - 52.

Filipski, Robert M. "Understanding the New Overhead Capitalization Rules." Management Accounting, Vol. 68, No. 8, February 1987, pp. 47 - 49.

Finch, Bryon J. and James F. Cox. "An Examination of Just-In-Time Management for the Small Manufacturer: With An Illustration." International Journal of Production Research, Vol. 24, No. 2, March-April 1986, pp. 329 - 342.

Frank, Werner G. " 'Back to the Future:' A Retrospective View of J. Maurice Clark's Studies in the Economics of Overhead Costs." Journal of Management Accounting Research, Vol. 2, Fall 1990, pp. 155 - 166.

Frecka, Thomas J. and Robert McIlhattan. "Does Your Direct Labor-Based Cost System Make Sense?" Journal of Cost Management for the Manufacturing Industry, Vol. 1, No. 3, Fall 1987, pp. 32 - 38.

Garner, S. Paul. Evolution of Cost Accounting (University, Alabama: University of Alabama Press, 1954).

Gaumnitz, Bruce R. and Felix P. Kollaritsch. "Cost Management Practice: Manufacturing Variances: Current Practice and Trends." Journal of Cost Management for the Manufacturing Industries, Vol. 5, No. 1, Spring 1991, pp. 58 - 64.

Gilbert, James P. and Richard J. Schonberger. "Inventory- Based Production Control Systems: A Historical Analysis." Production and Inventory Management, Vol. 24, No. 2, Second Quarter 1983, pp. 1 - 14.

Grady, Mechael W. "Performance Measurement: Implementing Strategy." Management Accounting, Vol. LXXII, No. 12, June 1991, pp. 49 - 53.

Greene, Alice H. and Peter Flentov. "Cost Management Practice: Managing Performance: Maximizing the Benefit of Activity-Based Costing." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 2, Summer 1990, pp. 51 - 59.

Haedicke, Jack and David Feil. "In a DOD Environment: Hughes Aircraft Sets The Standard for ABC." Management Accounting, Vol. LXXII, No. 8, February 1991, pp. 29 - 33.

Harr, David J. "How Activity Accounting Works in Government." Management Accounting, Vol. LXXII, No. 3, September 1990, pp. 36 - 40.

Hasty, Susan E. "World Class Manufacturing." Apparel Industry Magazine, Vol. 52, No. 2, February 1991, pp. 22 - 24.

Herroelen, Willy, Zeger Degraeve, and Marc Lambrecht. "Justifying CIM: Quantitative Analysis Tool." CIM Review, Vol. 3, No. 1, Fall 1986, pp. 33 - 43.

Hyman, Warren. "Measuring and Controlling Manufacturing Costs." Journal of Accounting and EDP, Vol. 1, Spring 1985, pp. 10 - 18.

Johnson, H. Thomas and Robert S. Kaplan. "The Rise and Fall of Management Accounting." Management Accounting, Vol. 68, No. 7, January 1987, pp. 22 - 30.

Johansson, Hank. "The Revolution in Cost Accounting." Production and Inventory Management Review and APICS News, January 1985, pp. 42 - 46.

Jones, Lou F. "Product Costing at Caterpillar." Management Accounting, Vol. LXXII, No. 8, February 1991, pp. 34 - 42.

Kammlade, John G., Pravesh Mehra, and Terrence R. Ozan. "A Process Approach to Overhead Management." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 3, Fall 1989, pp. 5 - 10.

Kaplan, Robert S. "Measuring Manufacturing Performance: A New Challenge for Managerial Accounting Research." The Accounting Review, Vol. LVIII, No. 4, October 1983, pp. 686 - 704.

Kaplan, Robert S. "The Evolution of Management Accounting." The Accounting Review, Vol. LIX, No. 3, July 1984, pp. 390 - 418.

Kaplan, Robert S. "Quantitative Models for Management Accounting in Today's Production Environment." Working Paper, Harvard Business School, 1984.

Kekre, Sunder. "Strategic Consideration of Order Flexibility, Costs, and Delivery in Long-Term Contracts." Unpublished Working Paper, Carnegie-Mellon University, August 1986.

Kinney, William R., Jr. "Empirical Accounting Research Design for Ph.D. Students." The Accounting Review, Vol. LXI, No. 2, April 1986.

Kranowski, Nathan. "The Historical Development of Standard Costing Systems Until 1920." Working Paper No. 32, The Academy of Accounting Historians' Working Paper Series, Vol. 2, 1979, pp. 206 - 220.

Lee,John Y. "Developing a Pricing System for a Small Business." Management Accounting, Vol. 68, No. 9, March 1987, pp. 50 - 53.

Lee, John Y. "Activity-Based Costing at Cal Electronic Circuits." Management Accounting, Vol. LXXII, No. 4, October 1990, pp. 36 - 38.

Lere, John C. "Product Pricing Based on Accounting Costs." The Accounting Review, Vol. LXI, No. 2, April 1986, pp. 318 - 324.

Lessner, John A. "Traps to Avoid in Product Costing." Journal of Accountancy, Vol. 172, No. 1, July 1991, pp. 87 - 89.

McNair, C. J. "Interdependence and Control: Traditional vs. Activity-Based Responsibility Accounting." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 2, Summer 1990, pp. 15 - 25.

McNair, C. J.,CMA, Richard L. Lynch, and Kelvin F. Cross. "Do Financial and Nonfinancial Performance Measures Have to Agree?" Management Accounting, Vol. LXXII, No. 5, November 1990, pp. 28 - 36.

Mackey, James T. " 11 Key Issues in Manufacturing Accounting." Management Accounting, Vol. 68, No. 7, January 1987. pp. 32 - 37.

Meredith, Jack R. and Nallan C. Suresh. "Justification Techniques for Advanced Manufacturing Technologies."

International Journal of Production Research, Vol. 24, No. 5, September/October 1986, pp. 1043 - 1057.

Morse, Wayne J. and Kay Poston. "Accounting for Quality Costs - A Critical Component of CIM." CIM Review, Vol. 3, No. 1, Fall 1986, pp. 53 - 60.

Nanni, Alfred J., Jr., J. Robb Dixon, and Thomas E. Vollman. "Strategic Control and Performance Measurement." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 2, Summer 1990, pp. 33 - 42.

Newgarden, Albert, editor. New Concepts in Manufacturing Management (New York: American Management Association, 1961).

Parker, Thornton and Theodore Lettes. "Is Accounting Standing In The Way of Flexible Computer-Integrated Manufacturing?" Management Accounting, Vol. LXXII, No. 7, January 1991, pp. 34 - 38.

Peles, Yoram C. "A Note on Yield Variance and Mix Variance." The Accounting Review, Vol. LXI, No. 2, April 1986, pp. 325 - 329.

Plossl, George and Oliver Wright. "Designing and Implementing a Materials Requirements Planning System." Shop Floor Controls, APICS, 1973, pp. 133 - 154.

Plossl, George W. "Prerequisites to Meeting American's Challenge." APICS - The Performance Advantage, July 1991, pp. 22 - 25.

Primrose, P. L. "The Effect of AMT Investment on Costing Systems." Journal of Cost Management for the Manufacturing Industries, Vol. 2, No. 2, Summer 1988, pp. 27 - 30.

Pryor, Tom E. "In Search of a Strategy." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 3, Fall 1989, pp. 40 - 46.

Pryor, Tom E. "Designing Your New Cost System Is Simple (But Not Easy)." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 4, Winter 1990, pp. 43 - 47.

Reed, Ray. "CIM and World Class Performance - Are They Really Compatible?" P & IM Review with APICS News, Vol. 11, No. 4, April 1991, pp. 32 - 33.

Roehm, Harper A., Donald I. Klein, and Joseph F. Castellano. "Springing to World-Class Manufacturing." Management Accounting, Vol. LXXII, No. 9, March 1991, pp. 40 - 48.

Roth, Harold P. "New Rules for Inventory Costing." Management Accounting, Vol. 68, No. 9, March 1987, pp. 32 - 36, 45.

Sanderson, Gerald A., CFPIM. "Integrated Resource Management: A New Philosophy of Manufacturing Management." P & IM Review with APICS News, Vol. 11, No. 1, January 1991, pp. 35 - 37.

Sena, James A. and Lawrence Murphy Smith. "Designing and Implementing an Integrated Cost Accounting System." The Journal of Information Systems, Vol. 1, No. 1, Fall 1986, pp. 102 - 112.

Schiff, Michael. "Variable Costing: A Closer Look." Management Accounting, Vol. 68, No. 8, February 1987, pp. 36 - 39.

Schultz, Terry R. "The Process of Planning a 'Closed-Loop' System." Production and Inventory Management and APICS News, December 1983, pp. 48 - 50.

Scott, Peter and Mike Morrow. "International Cost Management: Activity-Based Costing and Make-or-Buy Decisions." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 48 - 51.

Smith, Keith V. and Mark P. Leksan. "A Manufacturing Case Study on Activity-Based Costing." Journal of Cost Management for the Manufacturing Industry, Vol. 5, No. 2, Summer 1991, pp. 45 -54.

Steimer, Thomas E. "Activity-Based Accounting for Total Quality." Management Accounting, Vol. LXXII, No. 4, October 1990, pp. 39 - 42.

Stephens, John J. "Accounting and Production Control." Shop Floor Controls, APICS, 1973, pp. 113 - 117.

Stromberg, Dan and Brian H. Kleiner. "Implementing a Participative Cost Management Program." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 3, Fall 1989, pp. 17 - 21.

Susman, Gerald I. "Product Life Cycle Management." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 2, Summer 1989, pp. 8 - 22.

Sutton, Sharon G. "A New Age of Accounting." Production and Inventory Management Journal, Vol. 32, No. 1, First Quarter 1991, pp. 72 - 75.

Swann, Don M. "Where Did the Inventory Go?" Management Accounting, May 1986, pp. 27 - 29.

Tatikonda, Lakshmi U., CPIM, and Rao J. Tatikonda, CPIM. "Overhead Cost Control - Through Allocation or Elimination?" Production and Inventory Management Journal, Vol. 32, No. 1, First Quarter 1991, pp. 37 - 42.

Troxler, Joel W. "Estimating the Cost Impact of Flexible Manufacturing." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 2, pp. 26 - 32.

Turk, William T. "Management Accounting Revitalized: The Harley-Davidson Experience." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 4, Winter 1990, pp. 28 - 39.

Turney, Peter B. B. "Using Activity-Based Costing to Achieve Manufacturing Excellence." Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 2, Summer 1989, pp. 23 - 31.

Turney, Peter B. B. "Cost Management Concepts and Principles: What Is The Scope of Activity-Based Costing?" Journal of Cost Management for the Manufacturing Industry, Vol. 3, No. 4, Winter 1990, pp. 40 - 42.

Turney, Peter B. B. and James M. Reeve. "Cost Management Concepts and Principles: The Impact of Continuous Improvement on the Design of Activity-Based Cost Systems." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 2, Summer 1990, pp. 43 - 50.

Turney, Peter B. B. "How Activity-Based Costing Helps Reduce Cost." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 29 - 35.

Tyson, Thomas. "The Factory in Transition: The Use of Bar Coding in Activity-Based Costing." Journal of Cost Management for the Manufacturing Industry, Vol. 4, No. 4, Winter 1991, pp. 52 - 56.

Vent, Glenn. "Accounting for Gold and Silver Mines: The Development of Cost Accounting." The Accounting Historians Journal, Vol. 13, No. 2, Fall 1986, pp. 77 - 88.

Vollum, Robert B. "Cost Accounting: The Key to Capturing Cost Information on the Factory Floor." Journal of Accounting and EDP, Vol. 1, Summer 1985, pp. 44 - 51.

Weisman, Dennis L. "How Cost Allocation Systems Can Lead Managers Astray." Journal of Cost Management for the Manufacturing Industries, Vol. 5, No. 1, Spring 1991, pp. 4 - 10.