

Mr. Julius Catrell, founder and president of Digital Images Inc., was worried. The company was doing more business than ever before - sales were at a rate of about a \$4 million a year-but net income had decreased slightly during recent months and the ratio of income to sales had dropped sharply. Mr. Catrell wondered what had gone wrong and what he could do about it. He called in his chief (and only) accountant, Mr. Norman Catrell, and asked him to find out what was happening.

Digital Images was a regional corporation located in Aurora, Illinois and doing a general printing business on a customer order basis. Mr. Catrell set the price to be charged for each job. When possible, he waited until the work was done and then quoted a price equal to 140 percent of the cost of the paper stock used, plus \$50.40 for each labor hour. Straight time wage rates in the past, adjusted for recent wage rate increases, had averaged about \$16.00 an hour, and this formula of charging 315% of the straight time wage rate seemed to provide an adequate margin to cover overhead costs and provide a good profit.

Most of Digital Images's work was done on the basis of predetermined contract prices. In bidding on these jobs, Mr. Catrell applied his standard pricing formula to his own estimates of the amount of labor and paper stock the job would require. He prided himself on his ability to make these estimates, but he sometimes quoted a price that was higher or lower than the formula price, depending on his judgment of the market situation.

Images's production procedures were fairly simple. When a customer's order was received, it was assigned a production order number and a production order was issued. The material to be printed, known as the customer's copy, was given to a copy editor who indicated on the copy the sizes and styles of type that should be used. The editor sometimes made changes in the copy, usually after telephoning the customer to discuss the changes.

Once the customer's material had been copy-edited, it was sent to the composing room, where it was set in type. A proof copy was printed by hand and returned to the copy editor, who checked the printed copy against the original. Any errors in the proof were indicated in the margin and the market proof was sent to the customer for approval. At this point the customer might decide to make changes in the copy, and these changes, as well as corrections of typesetting errors, were made as soon as the corrected proof was returned to the composing room.

In some cases a second proof was sent to the customer for his approval, but at Digital Images most orders were sent to the pressroom as soon as

the customer's corrections had been made and the copy editor had approved the second proof.

At this point, the order was ready for production on one of the presses in the pressroom. Printing instructions were contained in the production order which specified the particular press to be used; the number of copies to be printed; the color, size, style, weight, and finish of the stock or paper to be used; and similar details. Copies were the printed, bound and packaged for delivery to the customer.

An order could take as little as one day in the copy-editing and composing room stages or as long as several weeks. Printing, binding, and packaging seldom took more than two days except on very large production runs of multi page booklets.

For many years the shop had enough work to keep it busy steadily throughout the year, without serious seasonal slack. As a result, Digital Images's before-tax profit had fluctuated between 13 and 15 percent of net sales. The interim profit report for the first quarter of 1994 therefore came as a great shock to Mr. Catrell. Although volume was slightly greater than in the first quarter of 1993, profit was down to 7.18 percent of sales, an all-time low. The comparison, with all figures expressed as percentages of net sales, was as in table 1.

Mr. Catrell knew that the company's problem must be either low prices or excessive costs. Unfortunately, the cost data already available, told him little about the cost-price relationship for individual jobs. Digital Images's operating costs were classified routinely into 20 categories, such as salaries, pressroom wages, production materials, depreciation, and so forth. Individual jobs cost sheets were not used and the cost of goods in process was estimated only once a year, at the end of the fiscal year.

Detailed data were available only two kinds of items: paper stock issued and labor time. When stock was issued, a requisition form was filled out, showing the kind of stock issued, the quantity, the unit cost, and the production order number. Similar details were reported when unused stock was returned to the stockroom.

As for labor, each employee directly engaged in working on production orders filled in a time sheet each day, on which he recorded the time he started on a given task, the time he finished it or moved on to the other work, and (in the case of time spent directly on specific production order) the order number. The payroll clerk recorded his department number and pay grade on the time sheet. Mr. Catrell's first step was to establish some overall cost relationships. Employees, for example, fell into two different pay grades, with the following regular hourly wage rates:

These rates applied to a regular workweek of 40 hours a week and quarterly salaries were based on 13-week quarters. For work in excess of this number of hours, employees were paid an overtime premium of 50 percent of their hourly wage. Overtime premiums were negligible when the work load was light, but in a normal year they averaged about 5 percent of the total amount of hourly wages of the jobs done, computed at the regular hourly wage rate. In a normal year this was approximately 80 cents a direct labor hours.

In the first quarter of 1993, the company revenues of \$918,540 were based on 4,405 hours for copy editors and composers and 8,820 hours for pressmen for a total of 13,225 hours for 109 jobs and \$180,000 for materials. In Q1 1993, the copy editors and composers worked 223 hours of overtime and the pressmen worked 1,320 hours of overtime. Half of the pressmen's time was spent in the pressroom and whenever the pressmen worked in the pressroom they worked on some machine. The rest of the pressmen's time was spent in binding and stock rooms.

In addition to their wages, the employees also received various kinds of benefits, including vacation pay, health insurance, and old age pensions. The cost of these benefits to Digital Images amounted to about 70 percent of the total amount of hourly wages of the jobs done, computed at the regular hourly wage rate. The overtime premiums did not affect the amount of fringe benefits paid or accrued. Health insurance was \$1,300 per person per quarter and pension fundings were 20% of the regular time wages.

Mr. Catrell estimated that all other shop overhead (indirect) costs - that is, all copy department, composing room and pressroom costs other than direct materials, direct labor, overtime premiums, and employee benefits on direct labor payrolls - would average \$8 a direct labor hour billed in a normal year. These indirect costs and the selling general and administrative expenses are as follows

All the indirect costs (except the supervisor salaries) were for the machines in the pressroom. Further the selling and administrative expenses were as in table 4.

Armed with these estimates of general relationships, Mr. Catrell then proceeded to determine the total costs of several recent production orders. One of these was the Penachi trucking job. This was received for copy editing on Monday, February 5 and delivered to the customer on Friday, February 9. Mr. Catrell had quoted a price of \$5,950 on this job in advance, on the basis of an estimate of \$1,800 for paper stock costs and 68 direct labor hours. All requisitions and time records relating to the Penachi trucking job are included in the lists in Table 5. (To save space, most of the details shown on the requisitions and time tickets have been omitted from this table.)

Questions

- a. Explain to a layman why labor costing \$16.00 per hour on average should be charged for at the rate of \$50.40 per hour? Check the figures in table 1 to 4 and show that Mr. Catrell's pricing scheme will lead to a profit margin of 14% in Q1 1993. Develop a costing rate or rates for labor costs, to be used to charge a job cost sheet or factory overhead of labor time. You must decide whether to use a single rate for all pay grades or a separate rate for each. You must also decide whether to fringe benefit costs in the labor costing rates or to regard these as overhead. Also develop an overhead rate for use in charging shop orders.
- b. Prepare a job order cost sheet for the Penachi trucking job and enter the costs that would be assigned to this order, using the costing rates you developed in the above, answer to (a).
- c. What conclusions might Mr. Catrell have reached on the basis of his analysis of this order? What suggestions would you make to Mr. Catrell? Did he make money on the Penachi trucking job? What did the job actually cost Digital Images, Inc.?
- d. What could be the advantages of developing product unit costs routinely for every job? Do you think that these advantages would be great enough to persuade Mr. Catrell to hire an additional clerk for his purpose at an annual cost of about \$10,000?

Table 1 Operating Results	Q1 1993	Q1 1994
Net sales	100.00%	100.00%
Production costs	71.40%	77.60%
Operating margin before selling and administrative expenses	28.61%	22.40%
Profit	14.02%	7.18%

Table 2 Labor rates		
Grade	Rate	# of employees
Copy editors and composers	\$24.00	10
Pressmen	\$12.00	20

Table 3 Indirect costs	Q1 1993
Salary (Including fringe benefits) for	
Supervisors	\$33,696
Machine maintenance engineers	\$30,888
Machine lease payments	\$31,300
Power and supplies for machine	\$9,600
Total indirect costs	\$105,484

Table 4	Q1 1993
Selling and general administrative expenses	
Purchasing department	20,000
Inbound Shipping	16,000
Rent	10,000
Payroll	22,000
General and advertising	12,000
Customer Service and sales	20,000
Shipping expenses	10,000
Taxes and insurance	24,000
Total	\$134,000

Table 5 Actual usage for the Penachi trucking job		
Labor Grade	Total Hours	Overtime hours
Copy editors and composers	36	4
Pressmen total	36	8
of which in the machine room	27	7
Materials requisitioned		\$1,900