

## *Case 10*

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# *The Cutting Edge*

*by*

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Elroy had been with Barnes Machine Company a year since finishing a BS in industrial engineering (IE). Barnes had been in business for over 50 years, but the company had only recently moved from Detroit to Gainesville, Georgia. The public reason for the move was the economics of the old facility. Privately, based on comments he had heard, Elroy believed a shift to nonunion labor was a larger motive.

Elroy's boss is the production supervisor, Mr. Hill. Because the plant and the workforce are new, Elroy has been conducting time-and-motion studies to establish new production standards. While these were clearly needed, Elroy was impatient to apply other IE tools he had studied.

One Friday, Mr. Hill asked Elroy to attend a 10 a.m. meeting on Monday. Monday morning, Elroy was surprised to join not only Mr. Hill and John Blackburn, the head of manufacturing engineering, but also Mr. Simkins, the head of marketing and several others from sales and marketing. Most surprising was the attendance of the company's CEO, Mr. Barnes, Jr.

The meeting's purpose was to consider a request for proposal (RFP). As Mr. Simkins quickly pointed out, the request came from one of Barnes's most significant customers. The problem, and the reason for the special meeting, was that a successful bid would exceed current production capabilities. Mr. Simkins, in summarizing, said, "Fortunately Mr. Barnes was farsighted enough to have our new facility built with room for expansion."

Mr. Hill agreed: “I see no reason why we should not bid on this proposal. Of course, as John pointed out, we will need new production capability. While this RFP calls for a five-year delivery plan, the total number of parts has not been specified. Since Simkins believes the data will be available before the final proposal deadline, I suggest that we examine the economics of the various different manufacturing alternatives. To that end, I intend to have Elroy here start that study immediately.”

Mr. Barnes ended the meeting with, “I’m sure that not bidding won’t hurt our other business with them, but they have been a steady customer since my father started the company and I really would like to help them. Besides, whenever we have added new manufacturing capacity, Simkins has managed to sell it to someone. So whatever you do, Hill, don’t let Elroy be too pessimistic. Let’s get on with it. I expect a preliminary evaluation in two weeks. By the way, John, don’t forget about all that extra equipment we have stored from the old plant. You may find something there that will help keep the cost down.”

During the next several days, Elroy met several times with Mr. Hill and John Blackburn. John, who had joined the company after it moved, drove to a warehouse in Atlanta to inspect the stored equipment. In a meeting Wednesday, John said that only a new engine lathe would be required.

Hill said, “If that’s all we need to bid this job, Mr. Barnes will be very pleased. After all, what will it cost, 15 or 20 thousand?”

“We can probably find one in that price range, Mr. Hill,” John said, “but if we are going to consider this as a long-term investment that Mr. Simkins will market for us, I think we should seriously consider one of the automated systems that have become available in the past few years. Remember, this type of equipment usually lasts a long time. I am sure that it will still be serviceable long after we complete this contract.”

“OK, John, your point is well made,” Mr. Hill replied. “Elroy see what you can find that will do the job. Check with John on the specs, but take a close look at the economics for us.”

During the next few days, Elroy found that there were basically four different possible machine types that would do the job ranging from the traditional manual engine lathe to a computer-controlled lathe with robotic load/unload and tolerance checks. From the manufacturers, he obtained the information contained in Table 10-1.

**Table 10-1      Cost Data**

<u>Machine Type</u>	<u>Purchase Cost</u>	<u>Annual Maintenance Cost</u>
A. Manual	\$18,000	\$1,350
B. Semiautomatic	27,000	2,430
C. Automatic	64,000	4,250
D. Automatic with robotic load/unload	120,000	14,400

Machines A and B would each require a full-time operator. A single operator could service two of Machine type C, and Machine type D would require no operator at all. After consulting with John about the skill level required, Elroy checked with accounting and found that an operator would be paid at \$14.29 an hour. A 25% incentive is added to base pay for employees on the second or third shifts. In addition, fringe benefits would run 63% of base pay, and manufacturing overhead would be assigned at a rate of 47% of the operator's direct pay. Accounting had indicated that they would try to classify the equipment in the 5-year life category for tax depreciation purposes.

Mr. Hill, John, and Elroy decided that the analysis should be based on production runs of 1000 pieces due to uncertain availability of storage space. Elroy noted that each of the machines has a different production rate and setup procedure. Each manufacturer claims an expected life of about one million pieces. John pointed out that the machines all use the same cutting technique, which implies that the tool and material costs should be about the same. Elroy summarized this in Table 10-2.

**Table 10-2      Production Data**

<u>Machine</u>	<u>Setup Cost</u>	<u>Production Rate (Pieces/Hour)</u>	<u>Material + Tool Cost/Piece</u>
A	\$ 750	6 pieces	\$0.50
B	1000	12 pieces	0.50
C	3000	30 pieces	0.50
D	6000	30 pieces	0.50

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John pointed out that there is a part currently purchased from an outside vendor that could be produced on this equipment. He estimates the setup cost to be about the same and the production rates to be approximately twice as many pieces per hour for Machine A, about 50% greater for Machine B, and remaining about the same for Machines C and D. Machine tool and material cost would run about \$0.70 a unit.

When Elroy checks with accounting, he finds that they purchased about 7,000 of the parts last year. Marketing expects that to increase to 8,000 parts this year and remain steady for a while. Accounting tells him that the average cost per purchased part is \$4.26.

In previous economic studies of capital purchases, Elroy has been told to use an interest rate of 15%. He believes that he should do the same here.

Friday afternoon Elroy sits down to begin his analysis. He knows that everyone at the meeting next Monday will expect him to have an answer and that it is very likely that his report will determine whether or not Barnes responds to the RFP.