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System 6: A Pricing Strategy for Long Blanks

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Abstract

In System 6, small-diameter, low-grade hardwood timber is used to make blanks in standard sizes. Blanks are made in one thickness and one quality class but in all the standard lengths during each production run. The quantity of blanks per length can be varied, while keeping total yield high, by using proper production control techniques. However, when the percentage of long blanks is increased beyond 15 percent, yields of required blanks will drop—though total yields remain constant—and earnings will be lowered. We describe a procedure that can be used to keep constant or improve earnings when the demand for long blanks exceeds the 15-percent level.

Introduction

In System 6, small-diameter, low-grade hardwood timber is bucked to 6- or 8-foot bolts; each bolt is sawed to two cants; the cants are resawed to boards; the boards are kiln dried; and the kiln-dried boards are made to blanks. The marketing aspects of System 6 and blanks are explained by Reynolds and Gatchell (1979). The System 6 technology is discussed by Reynolds and Gatchell (1982) and a sample plant design is available (Reynolds and Hansen 1984). The economics of using System 6 to make standard-size blanks is explained by Hansen and Reynolds (1984). The derivation of the standard blank sizes is discussed by Araman and others (1982). Operating methods used in the System 6 rough mill to convert the kiln-dried boards to specific quantities of blanks are explained by Reynolds (1984).

We have obtained good yields of blanks with System 6 technology using small-diameter, low-grade hardwoods. Yield is affected by timber quality and by the quantity of blanks needed in each length. The standard blank sizes are shown in Table 1. In general, blank yields are high enough to give good profits when the demand for blanks 50 inches and longer ("long blanks") does not exceed 15 percent of the square-foot area in any

Table 1.—Hardwood blank standard sizes for furniture and cabinet manufacturers, in inches

Nominal thickness	Intended product finish thickness	Actual blank thickness	Blank length												
			Clear Quality/26-Inch-Wide Blanks												
5/8	3/8	1/2	13	15	17	18	22	26	31	36	42				
3/4	1/2	5/8	14	17	19	22	25	29	31	35	41	47	58	86	
1	3/4	7/8	15	18	21	25	29	33	38	45	50	60	75	100	
1-1/4	1	1-1/8	15	18	21	25	29	33	38	45	50	60	75	100	
1-1/2	1-1/4	1-3/8	15	18	21	25	28	32	35	40	45	50	60	70	85
2	1-5/8	1-3/4	15	18	21	25	28	32	35	40	45	50	60	70	90
			Core Quality/26-Inch-Wide Blanks												
1	3/4	7/8	15	18	21	23	26	29	34	40	50	60	70	95	
1-1/4	1	1-1/8	15	18	21	23	26	29	34	40	50	60	70	85	
			Sound Quality/20-Inch-Wide Blanks[a]												
1	3/4	7/8	13	17	19	22	24	27	29	33	44	54	70	80	100
1-1/4	1	1-1/8	15	18	20	23	25	28	33	45	55	65	80	90	100
1-1/2	1-1/4	1-3/8	14	18	21	24	28	31	34	40					
2	1-5/8	1-3/4	12	16	19	21	24	28	30	34					
			Sound Quality/20-Inch-Wide Blanks[b]												
1	3/4	7/8	15	18	21	25	29	34	40	50	60	70	95		

[a] For upholstery frames.
[b] For case goods.

one production run. Small-diameter, low-grade timber that does not yield 15-percent long blanks is generally considered too poor to be used in System 6. By contrast, better than average timber can support production runs with demands greater than 15-percent long blanks.

Demand for long blanks, expressed as a percentage of the industry's total demand for blanks, is 21 for solid wood furniture, 28 for veneered furniture, and 13 for kitchen cabinets (Araman et al. 1982). Consequently, some orders for blanks will exceed 15-percent long blanks.

Furniture, kitchen cabinet, and dimension companies that operate their own conventional rough mills do not have trouble making parts shorter than 50 inches. But they must use the highest quality, most expensive lumber to make longer parts. Therefore, these manufacturers would like to buy long blanks for cutup to long parts and make the shorter parts themselves. Blanks producers should be able to sell all the long blanks they can make as a lucrative sideline provided that long blanks are not priced too high.

Operating Procedures

When orders for blanks are received, they are evaluated with program BLANKS (Araman 1983). The results of program BLANKS give the quantities of blanks per length for a given thickness and quality required in a production run. Cutting bills 1 through 4 (Table 2) are typical of bills where the requirements for long blanks are 15 percent or less. With typical System 6 quality timber, the yields are consistently good for these cutting bills. But when the need for long blanks exceeds 15 percent of the total square footage required, as shown in cutting bills 5 through 9, the yields in specified blanks drop. When yields are lower, earnings are lower. Earnings can be kept constant by charging extra (a surcharge) for the long blanks.

In the following section we describe eight System 6 mill operating procedures that can be used to determine the surcharge when more than 15-percent long blanks must be produced. Procedures 1 through 7 resulted in high surcharges and were rejected. Procedure 8 was found acceptable.

Table 2.—4/4 C1F cutting bills, in percent of total square feet

Length class	Cutting bill								
	1	2	3	4	5	6	7	8	9
Long (72–50 inches)	0	5	10	15	20	25	30	35	40
Medium (49–32 inches)	10	15	20	25	30	35	40	45	50
Short (31–21 inches)	50	45	40	35	30	25	20	15	10
Salvage (20 inches or less)	40	35	30	25	20	15	10	5	0

Procedure 1: Normal Operations

When no special modifications to the System 6 operations are made, yields are good for cutting bills 1 through 4. As demand for long blanks increases (cutting bills 5 through 9), yields in the blanks required decrease. The decrease in revenues caused by the decrease in required blanks could be made up by a surcharge for the long blanks. But to keep return on investment (ROI) constant, such surcharges would need to range from 50 to 170 percent of the normal blanks price.

Procedure 2: Two-Blank Quality

In this procedure we sorted System 6 kiln-dried boards into two quality classes. Boards graded No. 3A Common and Better were used to make clear-quality blanks. The remainder was used to make frame-quality blanks. The yield of frame-quality blanks was good (Reynolds and Araman 1983), but the value of frame blanks was considerably lower than clear-one-face (C1F) blanks. Consequently, for cutting bills 5 through 9, the yield of clear blanks from the better boards was not high enough to offset the lower earnings of the frame blanks. Surcharges ranging from 50 to 170 percent of the normal blanks price were needed for the long, clear blanks to bring earnings to the required level.

Procedure 3: Better Cants

Not all small-diameter, low-grade timber suitable for System 6 is of the same quality. Quality varies between sites. Would it be practical to save the cants made from better quality timber to be used when more long blanks are required? Sorting and saving would increase costs and might entice timber managers to charge more for better wood. Using data from a study with black cherry (Reynolds and Hansen, in press), we compared "normal" quality cherry cants with "better" quality cherry cants. We added 15 percent to the cost of better cherry cants. The higher yields of blanks from the better cants using cutting bills 5 through 9 did not offset the higher cant cost. Surcharges for long blanks ranging from 25 to 135 percent were required to bring earnings to the required level.

Procedure 4: Sell Everything

System 6 rough-mill operations are preplanned so that only those blanks required by the cutting bill are made (Reynolds 1984). We can achieve this with "normal" System 6 quality timber when the percentage of long blanks is 15 percent or less. When a cutting bill requires more than 15-percent long blanks, the System 6 techniques require more wood to be processed. One result of this additional processing is blanks in the shorter lengths being produced in excess of the cutting bill requirements. There is no market for these excess blanks at standard prices.

Procedure 4 calls for generating additional demand by discounting the prices of the excess shorter length blanks. By this process, new markets might be found. If we price discount the excess blanks shorter than 50 inches but longer than 20 inches by 25 percent, and price discount the 20-inch and shorter blanks by 50 percent, additional revenues are earned. This extra money does not eliminate the necessity for long-blank surcharges. It does, however, lower the required surcharges to a range of 25 to 50 percent. So the Procedure 4 is better than the first three, but is still not acceptable.

Procedure 5: Chips and Blanks

In Procedure 3, we considered buying better quality timber for use when cutting bills with more than 15-percent long blanks are used. Another way to improve the quality of the kiln-dried boards going through the rough mill is to chip some of the poorest boards as they leave the cant gang resaw. Then more cants will have to be purchased to make enough of the kiln-dried boards to keep the rough mill busy. Sales of the chips from the poorest green boards partially offset the cost of additional cants. Chip values are only about half the cant cost.

This procedure works well if you can buy additional cants at the regular cant price and if the quality of the additional cants is as good as or better than the quality of the regular cants. The better board quality, when 30 percent of the green boards are chipped, results in higher total yields and a higher percentage of long blanks. Cutting bills with up to 25-percent long blanks now can be accommodated without a long-blank surcharge. Surcharges of 33 to 103 percent are required when cutting bills (7 through 9) calling for more than 25-percent long blanks are used.

We then examined three possible combinations of these operating approaches:

Procedure 6: Combination of Procedures 2 and 4

Surprisingly, this combination does not work. Required long-blank surcharges range from 50 to 89 percent. These are greater than the surcharges with Procedure 4 alone.

Procedure 7: Combination of Procedures 3 and 4

This combination also does not work well. Surcharges range from 10 to 45 percent, which is no better than the Procedure 4 alone.

Procedure 8: Combination of Procedures 4 and 5

Improving kiln-dried board quality by chipping the worst of the green boards, buying additional cants at the regular price, selling chips, and selling all of the extra blanks at discount prices will nearly eliminate the need for a long blank surcharge. When 30 percent of the green boards were chipped, or when additional cants were bought at regular prices, or when chips were sold for 50 percent of the cant cost, or when extra blanks less than 50 inches long but more than 20 inches long were sold at 25-percent discount, or when the excess blanks 20 inches and shorter were sold at 50-percent discount, there was no surcharge needed until demand for long blanks rose to 35 percent. A surcharge of 6 percent was needed for cutting bill No. 8 and 18 percent for cutting bill No. 9.

Since this relatively complex procedure is the best one and since the combination of factors can change over wide ranges, we wrote a computer program to assist in determining the surcharge required.

Using Program LOBLS1

Program LOBLS1 is written in BASICA for use on the IBM-PC. The two-diskette model with 256K memory and matrix printer is assumed. To start, we suggest the user format a diskette using the /s option. Then copy the MSDOS diskette files onto this diskette. We used COMMAND.COM, ANSI.SYS, PRINT.COM, ASSIGN.COM, FIND.EXE, and BASICA.COM. Then copy the program listed in the Appendix and save it on this diskette. Now format a second diskette without the /s option. Put the first diskette in drive A and the second diskette in drive B to be used as a scratch file.

The program runs by first calling data from the B drive as the "B:LOBLS1.DAT" file. Since this file will not exist on the B drive diskette for the first run, use the following procedure to set up the file:

- Load the program as "A:LOBLS1.BAS".
- Erase lines 70, 80, and 90 by entering 70-return, 80-return, 90-return.
- Enter RUN and the data input listing on the screen will show all values as zeros.
- Following the prompt line, enter dummy values in all 12 data lines. We suggest using the input data values given in the demonstration printout.
- Enter 13,13 to continue the program.
- When the program is completed, the "B:LOBLS1.DAT" file will have been created.
- Load the program again as "A:LOBLS1.BAS" and lines 70, 80, and 90 will be in the computer memory.

The data used in these demonstration runs were obtained in the black cherry study cited earlier (Reynolds and Hansen, in press). Yield data for the typical quality cherry small-diameter, low-grade timber are shown in Table 3. When 30 percent of the green boards were chipped and additional cants were bought to replace these boards, the yield data are as shown in Table 4.

Table 3.—4/4 C1F long-blank yields from typical quality cherry boards, in percent of blank output

Cutting bill	Yield			Total
	Required blanks	Extra blanks[a]	Excess salvage blanks[b]	
1	44.6	0.0	0.0	44.6
2	45.2	0.0	0.0	45.2
3	45.5	0.0	0.0	45.5
4	46.4	0.0	0.0	46.4
5	37.4	1.3	8.6	47.3
6	40.2	4.5	2.5	47.2
7	34.4	7.2	5.0	46.6
8	30.4	9.2	7.1	46.7
9	27.0	11.3	8.4	46.7

[a] 45 to 21 inches long made but not required.
[b] 18 to 15 inches long made but not required.

Table 4.—4/4 C1F long-blank yields from typical quality cherry boards with 30 percent of the boards chipped, in percent of blank output

Cutting bill[a]	Yield: Required blanks	Extra blanks[b]	Excess salvage blanks[c]	Total
5	52.3	0.0	0.0	52.3
6	46.9	3.4	1.9	52.2
7	40.4	6.1	4.5	51.0
8	35.9	8.8	6.6	51.3
9	31.8	11.0	8.4	51.2

[a] Cutting bills 1 through 4 not considered.
[b] 45 to 21 inches long made but not required.
[c] 18 to 15 inches long made but not required.

In demonstration run No. 1, the input data are:

1. $15,840 per shift is required for the cash flow in.
2. When cutting bill No. 8 (Table 4) was used, there was a 35.9-percent yield of required blanks.
3. There was an additional 8.8-percent yield of blanks shorter than 50 inches but longer than 20 inches.
4. There was an additional 6.6-percent yield of blanks 20 inches or shorter.
5. The blanks required by the cutting bill, item 2, will sell for $2.20 per square foot.
6. The extra blanks, item 3, will sell for $1.65 per square foot.
7. The excess salvage blanks, item 4, will sell for $1.10 per square foot.
8. Cutting bill No. 8 calls for 35 percent of all blanks to be 50 inches or longer.
9. Thirty percent of all green boards, the poorest boards, will be sent to the chipper.
10. Cant cost is $180 per thousand board feet (Mbf), free on board (f.o.b.) the System 6 mill, and will not change as more cants are purchased.
11. Chips are worth $13.25 per green ton f.o.b. the System 6 mill.
12. There will be 16.0 Mbf of kiln-dried boards input per shift to the System 6 mill.

In demonstration run No. 1 (Fig. 1) the output values are:

- There were 5,744 square feet of required blanks made (35.9 percent of 16,000 board-foot input), which brought in $12,637 at $2.20 per square foot.

```
                      LONG BLANKS SURCHARGE Program 1              03-07-1985

                 Poorest boards chipped; all blanks sold            15:08:33

                                   Input Data
   1 Cash flow req'd=    $15,840.00   7 Exc salv blanks price= $ 1.10
   2 Req'd blanks yield=      35.9%   8 Percent long blanks=    35.0%
   3 Extra blanks yield=       8.8%   9 Percent boards chipped= 30.0%
   4 Exc salv blanks yield=    6.6%  10 Cant cost=             $180.00/mbf
   5 Req'd blanks price      $ 2.20  11 Chip price=            $ 13.25/ton
   6 Extra blanks price      $ 1.65  12 Board input per shift   16.00mbf

RUN IDENT:DEMONSTRATION #1

                                   Output Values
     Required blanks made=          5,744sqft        Value $12,637
     Extra blanks made=             1,408sqft        Value $ 2,323
     Exc sal blanks made=           1,056sqft        Value $ 1,162
     Chips made=                    12.00tons        Value $   159
     Total cash flow in                                    $16,281
     Additional cants for chips=     4.80mbf         Value $   864
     Cash flow in defecit: earn from surcharge           = $   423
     Long blanks made=             2,010sqft         Value $ 4,423
     Cash flow in req'd from long blanks                   $ 4,846
  Long blanks price=  $ 2.41/sqft     Long blanks surcharge=  $ 0.21/sqft
```

Figure 1.—Program LONG BLANKS SURCHARGE output: Demonstration run No. 1.

- There were 1,408 square feet of extra blanks made (8.8 percent of 16,000 board-foot input), which brought in $2,323 at $1.65 per square foot.

- There were 1,056 square feet of excess salvage blanks made (6.6 percent of 16,000 board-foot input), which brought in $1,162 at $1.10 per square foot.

- Twelve tons of green chips were made (30 percent of 16 Mbf cant input at 2.5 tons per Mbf), which brought in $159 at $13.25 per ton.

- The total of these four items was $16,281.

- An additional 4.8 Mbf of cants at $180 per Mbf had to be purchased to make up for the boards chipped. This cost $864.

- There was $15,417 cash flow in after the additional cants were paid for ($16,281 − $864 = $15,417). The cash flow in required was $15,840 but only $15,417 was brought in, creating a $423 deficit ($15,840 − $15,417 = $423).

- There were 2,010 square feet of long blanks made (35 percent of 5,744 square feet of required blanks) valued at $4,423 (2,010 × $2.20 = $4,422).

- The deficit would have to be made up from the sale of long blanks. A $423 deficit added to the $4,422 long blank value means that $4,846 ($423 + $4,422 = $4,846) needs to be earned by the sale of long blanks.

- The 2,010 square feet of long blanks must be sold for $2.41 per square foot ($4,845/2,010 = $2.41). The long-blanks' surcharge will be $0.21 per square foot.

If no boards had been chipped (Input 9 = 0), the yields would have been 30.4 percent for required blanks (Input 2 = 30.4), 9.2 percent for extra blanks (Input 3 = 9.2), and 7.1 percent for excess salvage blanks (Input 4 = 7.1). These data are shown in Table 3. The surcharge would have been $0.86 per square foot, as shown in demonstration run No. 2 (Fig. 2).

When we use cutting bill 6 and chip 30 percent of the green boards, the yields are 46.9 percent for required blanks, 3.4 percent for extra blanks, and 1.9 percent for excess salvage blanks (Table 4). As shown in demonstration run No. 3 (Fig. 3), there is a negative surcharge. This means that if we charge the regular prices, there will be an additional cash flow in of $1,196.

```
                 LONG BLANKS SURCHARGE Program 1              03-07-1985

            Poorest boards chipped; all blanks sold           14:43:52

                              Input Data
   1 Cash flow req'd=   $15,840.00   7 Exc salv blanks price= $ 1.10
   2 Req'd blanks yield=     30.4%   8 Percent long blanks=    35.0%
   3 Extra blanks yield=      9.2%   9 Percent boards chipped=  0.0%
   4 Exc salv blanks yield=   7.1%  10 Cant cost=           $180.00/mbf
   5 Req'd blanks price     $ 2.20  11 Chip price=          $ 13.25/ton
   6 Extra blanks price     $ 1.65  12 Board input per shift   16.00mbf

RUN IDENT:DEMONSTRATION 2

                              Output Values
     Required blanks made=          4,864sqft        Value $10,701
     Extra blanks made=             1,472sqft        Value $ 2,429
     Exc sal blanks made=           1,136sqft        Value $ 1,250
     Chips made=                     0.00tons        Value $     0
     Total cash flow in                                    $14,379
     Additional cants for chips=     0.00mbf         Value $     0
     Cash flow in defecit: earn from surcharge            = $ 1,461
     Long blanks made=             1,702sqft         Value $ 3,745
     Cash flow in req'd from long blanks                   $ 5,206
  Long blanks price=  $ 3.06/sqft     Long blanks surcharge=  $ 0.86/sqft
```

Figure 2.—Program LONG BLANKS SURCHARGE output:
Demonstration run No. 2.

```
                 LONG BLANKS SURCHARGE Program 1              03-07-1985

            Poorest boards chipped; all blanks sold           15:10:35

                              Input Data
   1 Cash flow req'd=   $15,840.00   7 Exc salv blanks price= $ 1.10
   2 Req'd blanks yield=     46.9%   8 Percent long blanks=    25.0%
   3 Extra blanks yield=      3.4%   9 Percent boards chipped= 30.0%
   4 Exc salv blanks yield=   1.9%  10 Cant cost=           $180.00/mbf
   5 Req'd blanks price     $ 2.20  11 Chip price=          $ 13.25/ton
   6 Extra blanks price     $ 1.65  12 Board input per shift   16.00mbf

RUN IDENT:DEMONSTRATION #3

                              Output Values
     Required blanks made=          7,504sqft        Value $16,509
     Extra blanks made=               544sqft        Value $   898
     Exc sal blanks made=             304sqft        Value $   334
     Chips made=                    12.00tons        Value $   159
     Total cash flow in                                    $17,900
     Additional cants for chips=     4.80mbf         Value $   864
     Cash flow in defecit: earn from surcharge            = $-1,196
     Long blanks made=             1,876sqft         Value $ 4,127
     Cash flow in req'd from long blanks                   $ 2,931
  Long blanks price=  $ 1.56/sqft     Long blanks surcharge=  $-0.64/sqft
```

Figure 3.—Program LONG BLANKS SURCHARGE output:
Demonstration run No. 3.

Conclusions

A System 6 blanks manufacturer may need to make large quantities of long blanks. Or an opportunity may arise where a blanks customer is willing to pay a premium price for long blanks. Operating the System 6 business as usual to make the additional long blanks will not be practical. By chipping the poorest boards and by selling the extra short blanks at reduced prices, the making of additional long blanks is practical and could be very lucrative.

When furniture and kitchen cabinet manufacturers are willing to pay surcharges for long blanks, when more cants are available, and when the extra chips and blanks can be sold at reduced prices, the System 6 mill can be operated at greater profit. The System 6 mill manager should have the long-blank surcharge program "LOBLS1.BAS" on the mill IBM-PC so these additional profit opportunities can be seized.

The only other option is to operate the standard mill at a reduced ROI because of lower returns.

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Appendix I Computer Program to Determine Long-Blank Surcharge

```
10 REM This program will calculate the long blanks surcharge needed to meet the
20 REM required cash flow per shift. It is written in BASICA for the IBM PC. It
30 REM saved as "A:LOBLS1.BAS".
40 CLS
50 KEY OFF
60 DEFINT N
70 OPEN "B:LOBLS1.DAT" FOR INPUT AS #1
80 INPUT #1, CFIR,YRB,YEB,YESB,RBP,EBP,ESBP,PLB,PBC,CC,CP,BIPS
90 CLOSE #1
100 N=0
110 ID1$="   1 Cash flow req'd=    $##,###.##"
120 ID2$="   2 Req'd blanks yield=      ##.#%"
130 ID3$="   3 Extra blanks yield=      ##.#%"
140 ID4$="   4 Exc salv blanks yield=   ##.#%"
150 ID5$="   5 Req'd blanks price      $##.##"
160 ID6$="   6 Extra blanks price      $##.##"
170 ID7$="   7 Exc salv blanks price=  $##.##"
180 ID8$="   8 Percent long blanks=     ##.#%"
190 ID9$="   9 Percent boards chipped=  ##.#%"
200 ID10$="  10 Cant cost=             $###.##/mbf"
210 ID11$="  11 Chip price=            $###.##/ton"
220 ID12$="  12 Board input per shift    ##.##mbf"
230 CLS
240 PRINT: PRINT:
250 PRINT TAB(10) "LONG BLANKS SURCHARGE Program 1": PRINT
260 PRINT "Poorest boards chipped; all blanks sold": PRINT
270 PRINT TAB(15) "Input Data"
280 PRINT USING ID1$; CFIR
290 PRINT USING ID2$; YRB
300 PRINT USING ID3$; YEB
310 PRINT USING ID4$; YESB
320 PRINT USING ID5$; RBP
330 PRINT USING ID6$; EBP
340 PRINT USING ID7$; ESBP
350 PRINT USING ID8$; PLB
360 PRINT USING ID9$; PBC
370 PRINT USING ID10$; CC
380 PRINT USING ID11$; CP
390 PRINT USING ID12$; BIPS
400 PRINT "  13 To solve using this data enter 13,13": PRINT
410 INPUT  "ENTER NUMBER AND DATA VALUE FOR CHANGES"; N,DUM
420 IF N=1 THEN CFIR=DUM ELSE 440
430 GOTO 410
440 IF N=2 THEN YRB=DUM ELSE 460
450 GOTO 410
460 IF N=3 THEN YEB=DUM ELSE 480
470 GOTO 410
480 IF N=4 THEN YESB=DUM ELSE 500
490 GOTO 410
500 IF N=5 THEN RBP=DUM ELSE 520
```

```
510 GOTO 410
520 IF N=6 THEN EBP=DUM ELSE 540
530 GOTO 410
540 IF N=7 THEN ESBP=DUM ELSE 560
550 GOTO 410
560 IF N=8 THEN PLB=DUM ELSE 580
570 GOTO 410
580 IF N=9 THEN PBC=DUM ELSE 600
590 GOTO 410
600 IF N=10 THEN CC=DUM ELSE 620
610 GOTO 410
620 IF N=11 THEN CP=DUM ELSE 640
630 GOTO 410
640 IF N=12 THEN BIPS=DUM ELSE 660
650 GOTO 410
660 IF N>12 GOTO 670
670 OPEN "B:LOBLS1.DAT" FOR OUTPUT AS #1
680 PRINT #1, CFIR;YRB;YEB;YESB;RBP;EBP;ESBP;PLB;PBC;CC;CP;BIPS
690 CLOSE #1
700 RBM=BIPS*1000*(YRB/100)
710 EBM=BIPS*1000*(YEB/100)
720 ESBM=BIPS*1000*(YESB/100)
730 CFIC=CP*2.5*BIPS*(PBC/100)
740 CFIRB=RBM*RBP
750 CFIEB=EBM*EBP
760 CFIESB=ESBM*ESBP
770 TCFI=CFIRB+CFIEB+CFIESB+CFIC
780 CFOAB=BIPS*(PBC/100)*CC
790 CFD=CFIR-TCFI+CFOAB
800 LBM=RBM*(PLB/100)
810 LBV=LBM*RBP
820 CFRLB=LBV+CFD
830 LBP=CFRLB/LBM
840 LBS=LBP-RBP
850 TCM=BIPS*(PBC/100)*2.5
860 ABR=BIPS*(PBC/100)
870 D$=DATE$: T$=TIME$
880 OD1$="     Required blanks made=        ##,###sqft"
890 OD2$="      Value $##,###"
900 OD21$="       Value $##,###"
910 OD4$="     Exc sal blanks made=         ##,###sqft"
920 OD3$="     Extra blanks made=           ##,###sqft"
930 OD5$="     Chips made=                   ##.##tons"
940 OD6$="     Total cash flow in                                  $##,###"
950 OD7$="     Cash flow in defecit: earn from surcharge         = $##,###"
960 OD8$="     Cash flow in req'd from long blanks                 $##,###"
970 OD9$="     Additional cants for chips=   ##.##mbf"
980 OD10$="     Long blanks made=           ##,###sqft"
990 OD11$=" Long blanks price=  $##.##/sqft"
1000 OD12$="     Long blanks surcharge=  $##.##/sqft"
```

```
1010 CLS
1020 PRINT
1030 PRINT TAB(20) "LONG BLANKS SURCHARGE Program 1";
1040 PRINT  TAB(65) D$
1050 PRINT TAB(15) "Poorest boards chipped; all blanks sold";
1060 PRINT TAB(65) T$
1070 PRINT TAB(30) "Input Data"
1080 PRINT USING ID1$; CFIR;
1090 PRINT USING ID7$; ESBP
1100 PRINT USING ID2$; YRB;
1110 PRINT USING ID8$; PLB
1120 PRINT USING ID3$; YEB;
1130 PRINT USING ID9$; PBC
1140 PRINT USING ID4$; YESB;
1150 PRINT USING ID10$; CC
1160 PRINT USING ID5$; RBP;
1170 PRINT USING ID11$; CP
1180 PRINT USING ID6$; EBP;
1190 PRINT USING ID12$; BIPS
1200 INPUT "RUN IDENT:"; RD$
1210 PRINT TAB(30) "Output Values"
1220 PRINT USING OD1$; RBM;
1230 PRINT USING OD2$; CFIRB
1240 PRINT USING OD3$; EBM;
1250 PRINT USING OD2$; CFIEB
1260 PRINT USING OD4$; ESBM;
1270 PRINT USING OD2$; CFIESB
1280 PRINT USING OD5$; TCM;
1290 PRINT USING OD2$; CFIC
1300 PRINT USING OD6$; TCFI
1310 PRINT USING OD9$; ABR;
1320 PRINT USING OD21$; CFOAB
1330 PRINT USING OD7$; CFD
1340 PRINT USING OD10$; LBM;
1350 PRINT USING OD21$; LBV
1360 PRINT USING OD8$; CFRLB
1370 PRINT USING OD11$; LBP;
1380 PRINT USING OD12$; LBS
1390 INPUT "ENTER 1 TO PRINT. ENTER 2 FOR NEW RUN"; NN
1400 IF NN=1 THEN 1420 ELSE 1410
1410 RUN 40
1420 LPRINT: LPRINT: LPRINT
1430 LPRINT TAB(20) "LONG BLANKS SURCHARGE Program 1";
1440 LPRINT  TAB(65) D$
1450 LPRINT
1460 LPRINT TAB(15) "Poorest boards chipped; all blanks sold";
1470 LPRINT TAB(65) T$
1480 LPRINT: LPRINT
1490 LPRINT TAB(30) "Input Data"
1500 LPRINT USING ID1$; CFIR;
```

```
1510 LPRINT USING ID7$; ESBP
1520 LPRINT USING ID2$; YRB;
1530 LPRINT USING ID8$; PLB
1540 LPRINT USING ID3$; YEB;
1550 LPRINT USING ID9$; PBC
1560 LPRINT USING ID4$; YESB;
1570 LPRINT USING ID10$; CC
1580 LPRINT USING ID5$; RBP;
1590 LPRINT USING ID11$; CP
1600 LPRINT USING ID6$; EBP;
1610 LPRINT USING ID12$; BIPS
1620 LPRINT
1630 LPRINT "RUN IDENT:"; RD$
1640 LPRINT
1650 LPRINT TAB(30) "Output Values"
1660 LPRINT USING OD1$; RBM;
1670 LPRINT USING OD2$; CFIRB
1680 LPRINT USING OD3$; EBM;
1690 LPRINT USING OD2$; CFIEB
1700 LPRINT USING OD4$; ESBM;
1710 LPRINT USING OD2$; CFIESB
1720 LPRINT USING OD5$; TCM;
1730 LPRINT USING OD2$; CFIC
1740 LPRINT USING OD6$; TCFI
1750 LPRINT USING OD9$; ABR;
1760 LPRINT USING OD21$; CFOAB
1770 LPRINT USING OD7$; CFD
1780 LPRINT USING OD10$; LBM;
1790 LPRINT USING OD21$; LBV
1800 LPRINT USING OD8$; CFRLB
1810 LPRINT USING OD11$; LBP;
1820 LPRINT USING OD12$; LBS
1830 LPRINT CHR$(12)
1840 GOTO 1390
1850 END
```

Reynolds, Hugh W.; Hansen, Bruce G. **System 6: A pricing strategy for long blanks.** Res. Pap. NE-573. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1986. 14 p.

In System 6, small-diameter, low-grade hardwood timber is used to make blanks in standard sizes. Blanks are made in one thickness and one quality class but in all the standard lengths during each production run. The quantity of blanks per length can be varied, while keeping total yield high, by using proper production control techniques. However, when the percentage of long blanks is increased beyond 15 percent, yields of required blanks will drop—though total yields remain constant—and earnings will be lowered. We describe a procedure that can be used to keep constant or improve earnings when the demand for long blanks exceeds the 15-percent level.

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Keywords: Low-grade utilization; hardwood dimension

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