



Q1 Estimated capacity required	2001	Telemat	Dagmat	Total
Unit Sales last year		30,000	210,000	
+ to replenish inventory to maintain sales in		500	4,500	
= Minimum production		30,500	214,500	
Machine hours required per unit		1.000	0.300	
Minimum machine hours needed to maintain sales		30,500	64,350	94,850
Sales unit increase over last year		10,000	90,000	
Increase in finished goods due to increase in sales		500	3,500	
Total units to be produced		10,500	93,500	
Machine hours required per unit		1.000	0.300	
Minimum machine hours needed		10,500	28,050	38,550
Total machine hours needed		41,000	92,400	133,400
Total hours available with three shifts				125,000
Estimated shortage				8,400

Q2 Is the third shift profitable	Telemat	Dagmat	Total
Unit Sales (Proposed)	40,000	300,000	
Machine hours required per unit	1.000	0.300	
Minimum machine hours needed	40,000	90,000	130,000
Percentage of capacity allocated	30.77%	69.23%	
Total hours available with three shifts			125,000
Total hours available with two shifts			93,000
Third shift incremental capacity (allocated to products)	9,846	22,154	32,000
Third shift incremental units	9,846	73,846	

Product contribution analysis	Telemat	Dagmat	Total
Selling price per unit	\$11.130	\$3.350	
Variable manufacturing costs			
Materials costs	\$2.500	\$0.550	
Labor costs	\$1.500	\$0.450	
Indirect Costs <u>2</u> \$ 1.75 × machine-hrs	\$1.750	\$0.525	
Variable manufacturing costs per unit	\$5.750	\$1.525	
Variable promotion cost per unit <u>3</u>	\$1.250	\$0.200	
Contribution margin per unit	\$4.130	\$1.625	

As contribution margin is positive for any product, third shift should be opened.

<u>3</u> Variable promotion cost per unit	Telemat	Dagmat
Product promotion expense increase	\$12,500	\$18,000
for sales unit increase of	÷ 10,000	90,000
Variable promotion cost per unit	= \$1.250	\$0.200

<u>2</u> Indirect Costs		machine-hrs	
2-shifts	\$ 180,000	93,000	
3-shifts	\$ 236,000	125,000	
Increment	\$ 56,000	÷ 32,000	= \$ 1.75 per machine hour

Q3 Which product must we cut - the one with the lower contribution margin per unit of the scarce resource. Here the scarce resource is machine hour.

	Telemat	Dagmat
Contribution margin per unit	\$4.130	\$1.625
Machine hours required per unit	÷ 1.000	0.300
Contribution margin per machine hour	\$4.130	\$5.417

Q4 Revised production plan		Telemat	Dagmat	Total
Minimum machine hours needed to maintain sales				94,850
Total hours available with three shifts				125,000
Machine hours available for extra production:		Plug	2,100	28,050
allocate all needed capacity to Dagmat				30,150
				Hours
Units produced	÷ 1.000	0.300 =	2,100	93,500
Total units		Plug		93,500
Increase in finished goods due to increase in sales			100	3,500
Units to be sold in 2001		Plug	2,000	90,000
Revised sales units			32,000	300,000
Total increase in finished goods inventory			600	8,000
Feasible production levels			32,600	308,000

Product costs		Telemat	Dagmat
Materials costs		\$2.50	\$0.55
Labor costs		\$1.50	\$0.45
Direct manufacturing costs		\$4.00	\$1.00
Indirect Costs			
	236,000		
Depreciation, Plant			
	50,000		
Total overhead costs			
	286,000		
Normal volume - 3 shifts			
	÷ 125,000		
Overhead rate per machine hour			
	\$2.29		
Machine hours per unit	1.000 0.300		
Overhead cost per unit		\$2.29	\$0.69
Full cost per unit		\$6.29	\$1.69

Optional: Variable financing costs		Telemat	Dagmat
Sales units increase		10,000	90,000
Finished goods inventory units increase		500	3,500
Cost per unit (Labor and materials only)		\$4.00	\$1.00
Investment in	Finished goods	\$2,000	\$3,500
	Raw materials	\$2,500	\$4,950
	Accounts receivable	\$20,000	\$54,000
	(less) Accounts payable	\$0	(\$4,950)
Total investment in working capital		\$24,500	\$57,500
Financing costs 10.00%		\$2,450	\$5,750
Financing costs per unit		\$0.245	\$0.064
Contribution margin per unit excluding financing costs		\$4.130	\$1.625
Contribution margin per unit		\$3.885	\$1.561
Contribution margin per machine hour		\$3.885	\$5.204

No Change in choice

Q5 Tentative Income statement	Telemat	Dagmat	Total
Unit Sales	32,000	300,000	
Selling price per unit	\$11.13	\$3.35	
Direct manufacturing costs	\$6.29	\$1.69	
Revenue	356,160	1,005,000	1,361,160
Cost of sales	201,216	505,920	707,136
Gross margin			654,024
Other expenses			
Product promotion expense	\$ 40,000	\$ 60,000	100,000
General sales & administrative expenses			210,000
Depreciation for office and sales facilities			25,000
Research and development expense			45,000
Special project expenditures			60,000
Interest on long term debt (maturing two years from now)			50,000
Interest on short term debt	10.00% x	30,000	490,000
Pre-tax income			3,000
Tax expense	40.00%		161,024
Net income			64,410
			96,614

1 Assue that the extra cash \$0 is used to reduce the loan

Tentative cash flow statement	Telemat	Dagmat	Total
Net income			96,614
+ Depreciation			50,000
Factory and factory equipment			25,000
Office and sales facilities			
- Increase in accounts receivable	\$4,000	\$54,000	(58,000)
- Increase in raw materials	\$500	\$4,950	(5,450)
- Increase in FG inventory at	\$6.29	\$1.69	
units	600	8,000	
+ Increase in accounts payable	(\$3,773)	\$ (13,491)	(17,264)
+ Increase in taxes payable	Ending =	0.50 x	\$4,950
	- Beginning		\$ 32,205
			27,000
Cash flow from operating activities			4,950
			101,055
- Equipment replacement expenditures			(90,000)
- Plant expansion expenditures			(200,000)
Cash flow from investing activities			(290,000)
- Repayment of short term debt			0
- Dividends			(30,000)
Cash flow from financing activities			(30,000)
Net cash flow			(218,945)

Additional borrowing				
New borrowing (assume for now) less cash decrease	\$ 218,945	-	\$ 20,000	= \$ 198,945
Average new borrowing (half the final borrowing)	\$ 198,945	÷	2	= \$ 99,472
Interest expense	10.00% x \$	99,472	=	\$ 9,947
Tax deduction on interest	40.00% x \$	9,947	=	\$ (3,979)
Half the tax deduction deferred to the next period				\$ (1,989)
Net cash paid for interest				\$ 7,958
Net cash from new borrowing				\$ 190,987

Effective cash inflow	190,987	/	198,945	=	96.00%
Cash to be borrowed	198,945	/	96.00%	=	207,234
Round to					207,234

Income statement	Telemat	Dagmat	Total
Revenue	356,160	1,005,000	1,361,160
Cost of sales	201,216	505,920	707,136
Gross margin			654,024
Other expenses			
Product promotion expense	40,000	60,000	100,000
General sales & administrative expenses			210,000
Depreciation for office and sales facilities			25,000
Research and development expense			45,000
Interest on long term debt (maturing two years from now)			50,000
Special project expenditures			60,000
Interest on short term debt	10.00% x	133,617	2
Pre-tax income			150,662
Tax expense	40.00%		60,265
Net income			90,397
Beginning loan balance	\$30,000	+ half of new borrowing	103,617

Cash flow statement	Telemat	Dagmat	Total							
Net income			90,397							
+ Depreciation			50,000							
- Increase in accounts receivable		54,000	(58,000)							
- Increase in raw materials		4,950	(5,450)							
- Increase in FG inventory at units	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>\$6.29</td> <td>x</td> <td>\$1.69</td> </tr> <tr> <td>600</td> <td>x</td> <td>8,000</td> </tr> </table>	\$6.29	x	\$1.69	600	x	8,000	(\$3,773)	(\$13,491)	(17,264)
\$6.29	x	\$1.69								
600	x	8,000								
+ Increase in accounts payable		4,950	4,950							
+ Increase in taxes payable	Ending =	0.50 x	\$60,265 =	30,132						
	- Beginning		27,000	3,132						
Cash flow from operating activities			92,766							
- Equipment replacement expenditures			(90,000)							
- Plant expansion expenditures			(200,000)							
Cash flow from investing activities			(290,000)							
- Repayment of short term debt			0							
+ New borrowing: short-term debt			207,234							
- Dividends			(30,000)							
Cash flow from financing activities			177,234							
Net cash flow			(20,000)							

Q6 Bank lending covenants		Telemat	Dagmat	Total
Accounts receivable	Beginning			186,000
	Additions		\$54,000	54,000
Inventories	Beginning			33,350
	Increase: Raw materials			4,950
	Additions to FG (units)	600	8,000	
	Labor + materials cost	\$4.00	\$1.00	
	Additions to FG	\$2,400	\$8,000	10,400
Total working capital				288,700
Maximum total borrowing	(50% of working capital)			144,350
Bank loans payable	Beginning			30,000
Maximum new borrowing				114,350

Cut dividends	Cut expenditures
Raise capital from other sources	Convince the bank to accept full cost figures