Report TNB03: Production Report

Professional School of Business and Technology | Hochschule Kempten University of Applied Sciences

important facts about the production lines your company possesses to produce the copy machines

	Aquisition Period	Aquisition Value	Remaining Running Time	Depreciation	Net Book Value	Other Fixed Costs	Residual Earnings
		mEUR	Periods	mEUR / Period	mEUR	mEUR	% from Book Value
Type A Line Nr. 1	-8	12.50	1	1.25	1.25	1.50	20.0
Type A Line Nr. 2	-7	15.00	2	1.50	3.00	1.00	20.0
Type A Line Nr. 3	-6	20.00	3	2.00	6.00	0.50	20.0
Type A Line Nr. 4	-5	20.00	4	2.00	8.00	0.25	20.0
Total		**67.50**		**6.75**	**18.25**	**3.25**	

Period 0: Four "Type A" production lines. The prices for the production lines were different, their total was 67,75 MEUR.
The company bought the product lines 5-8 periods ago. As you have to depreciate each Type A product line over 10 years, the remaining time (time you have to take depreciation into account) is different. Note that you can still use a production line after it is completely depreciated!
As you are allowed to depreciate an A line over 10 years, the total value of depreciation in the current period is 6.75 mEUR.
There are also fixed costs for each production line (3.25 mEUR) → will be needed for the Cost Type, Cost Center Acccounting (TNB7 and TNB8).

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If you multiply the depreciation per period with the remaining life you will get the Net book value of each production line. The total net book value can be further increased with further investments into Environmental parts (that will increase the environmental damage indicator). The total value of the Machines and Production facilities will be seen in the fixed assets of your Balance Sheet (TNB 15).

The residual earnings show you the percentage of net book value you get back if you disinvest the production line.

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Possibility of investing in new production lines of Type A, B or C and/or disinvest some or all of your existing production lines Type A (chapter 3.4.2)
Important key facts for the decision of investing in additional product lines:

Production lines (Type)	Purchase price (mEUR)	Duration (periods)	Normal capacity (Units / period)	Other FC (mEUR / period)	Environmen-tal index
A	20,00	10	14,000	0.3	100.0
B	25,00	10	18,000	2.0	105.0
C	30,00	15	22,000	2.5	110.0

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potential production capacity of your production lines (first column) and actual capacity, resulting from the influence of the maintenance and rationalization factor

	Normal Capacity		Maintenance	Rationalization	Available Capacity	Environmental Index
	Units	mEUR	Factor	Factor	Units	Index
Type A Line Nr. 1	8,000	1.50	0.97	1.00	7,760	83.0
Type A Line Nr. 2	9,000	1.50	0.97	1.00	8,730	90.0
Type A Line Nr. 3	11,500	1.50	0.97	1.00	11,155	95.0
Type A Line Nr. 4	13,500	1.50	0.97	1.00	13,095	98.0
Total / Average	**42,000**	**6.00**			**40,740**	**91.5**

- → These factors are influenced by the money spend on maintenance/rationalization.
- → Note: The value for maintenance is valid for each production line. If you decide to spend 1.5 mEUR for maintenance, this means, you spend 1.5 mEUR for EACH line!
- → As opposed to maintenance (which effects the availability only in the current period), rationalization has a long-lasting effect on the availability – also for all upcoming periods!

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Production lines are subject to constant wear and tear → investments are necessary to avoid reductions in capacity
The money spend on maintenance (here 6.0 mEUR – 4 production lines a 1,5 mEUR) influences the degree of capacity availability as shown in the following table:

Maintenance Costs per period and per production line in mEUR	Degree of capacity availability as % of normal capacity
0.1	50 %
0.5	70 %
0.7	80 %
1.0	95 %
1.5	97 %
3.0	99 %
4.0	100 %

Normal Capacity * Degree of Availability = Available Capacity I

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Total / Average	**42,000**	**6.00**			**40,740**	**91.5**

minimum level of maintenance expenses per production line: 0.10 mEUR.

further way to increase the available capacity: investing in rationalization
The rationalization factor depends on the cumulative expenses which incurred since Period 0

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Total / Average	**42,000**	**6.00**			**40,740**	**91.5**

Actual production capacity = potential capacity* rationalization factor* maintenance factor

→ (e.g. 8000* 0,97* 1,00 = 7.760)

Each production line has an specific environmental index. The average environmental index is important for the environmental damage indicator that can be seen at the end of this report.

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	Current Period	Previous Period
Workforce	852	853
- Absenteeism	47	-
= Available Staff	**805**	**-**
New Employees (%)	5.86	-
Process Optimization (mEUR)	0.00	0.00
Training Expenses per Employee (EUR)	1,000	-
Staff Motivation (Index)	56.5	50.0
Adaptation Index	1.00	-
x Process Optimization Index	1.00	-
x Staff Qualification Index	1.00	1.00
x Factor Motivation	1.00	-
= Productivity Index I	**1.00**	**-**

The company's available staff = Workforce minus Loss from Absence (852 – 47 = 805)
No exact calculation of the number of people lost from absenteeism possible

→ Influencing factors on absenteeism: chapter 3.5.7.6 of the participant's manual

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x Process Optimization Index	1.00	-
x Staff Qualification Index	1.00	1.00
x Factor Motivation	1.00	-
= Productivity Index I	**1.00**	**-**

The productivity index is the product of

a) Adoption index - influenced by the amount of newly hired employees
(you see that a percentage of 5,86% of newly hired people does not yet have a negative impact on the adoption index, but if it gets higher the adoption index will be below 1,00)

b) Process optimization index – influenced by the expenses for process optimization (see chapter 3.5.7.2)

c) Staff Qualification index - influenced by the spending's for training (chapter 3.5.7.3)

d) Factor motivation – based on the staff motivation index (chapter 3.5.6)

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	Classic
Cumulated Production up to Previous Period	0
Productivity Index II	**1.00**

	Classic
Basic Productivity (Units / Period)	50.00
x Productivity Index I	1.00
x Productivity Index II	1.00
= Productivity (Units / Period)	**50.02**

There is also an productivity index II that shows the learning curve (the more experienced you are – as you manufactured more units – the more productive you get)

Those two factors (Productivity index I and Productivity index II) are then multiplied with the number of copy machines one person is able to produce per period (50 "Copy Classic" in Period 0) to calculate the Production Staff factor of 50. (As the software is calculating more precisely with more digits the real figure is 50,02)

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STAFF

	Classic	Total
Available Staff (without Overtime)		805
Available Staff (Including Overtime)	885.50	
Productivity (Units / Period)	50.02	
Planned Production Quantity	40,000	
Actual Production Quantity	40,000	
Deployed Staff (Including Overtime)	**799.66**	
Utilization of Staff (%)		**99.3**

As your productivity index is 50,02 and you would like to produce 40,000 units you need a manpower of 799,66 people (deployed staff)
Your available staff is 805 (see report above). This means an utilization of staff of 99,3% (799,66/805)
If your utilization is above 100% it means you will have to make overtime. A maximum of 10% overtime is allowed. So you could have used a manpower of 885,50 (= 805 x 1,1) people.
With this manpower a production volume of 44292 (885,5 x 50,02) would have been possible.
So, your production staff was able to produce the planned production quantity of 40.000 units (= Actual production Quantity). Note that a single unit of overtime immediately leads to additional step fixed costs! ➔ If you go into overtime, then use it completely!

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PRODUCTION LINES

	Classic	Total
Available Production Capacity (without Overtime)		40,740
Available Production Capacity (Including Overtime)	44,814	
Production Line Capacity Needed per Finished Product	1.00	
Planned Production Quantity	40,000	
Actual Production Quantity	40,000	
Used Production Capacity	**40,000**	
Utilization of Production Lines (%)		**98.2**

The same calculation of utilization will be done for the production lines. First of all you need to know how much production capacity you need. This is dependent on the kind of product you produce. The factor for the Classic copy machine is 1,0. So you need a capacity of 40,000 on your production lines to produce the planned capacity of 40,000 units.
The table a few slides above shows you that the available production capacity is 40.740 units. As you planned production volume is 40,000 your utilization of production lines is 99.2% (40,000 / 40740). If your utilization is above 100% it means you will have to make overtime. A maximum of 10% overtime is allowed. So a production volume of 44,814 (= 40,740 x 1,1) would have been possible.
So, your production staff was able to produce the planned production quantity of 40.000 units (= Actual and used production Quantity). Note that a single unit of overtime immediately leads to additional fixed costs! ➔ If you go into overtime, then use it completely!

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Calculation of the environmental tax your company needs to pay in this period:

Environmental Ratings of Production Lines	(Index)	91.5
Cumulated Investment in Environmental Equipment	(mEUR)	1.50
Improvement of Environmental Ratios	(Points)	1.8
Environmental Damage Indicator for the Company	(Index)	93.3
Environmental Tax	(mEUR)	1.35

The environmental protection authority measures the environmental damage caused by the entire company (not by the individual production lines).

The 4 existing production lines A have a rating of 91.5. You can invest into Environmental Equipment. The investment of 1.5 mEUR leads to an increase of 1.8 points.

The new Environmental Damage indicator is 93.3 (91.5 + 1.8). As this is below 100 you have to pay a penalty charge (see chapter 3.4.5).