

THE PRODUCTION DEPARTMENT

1. Goals

The production department is in charge of the manufacturing of products and the procurement of raw materials (textiles and supply kits). Its primary goal is to deliver the products on time. This is not an easy task as the sales seasonality is high and production is smoothed over the entire year. Units produced during a given month are ready to be sold within this same month.

The production department plays also an important role in maintaining costs under a reasonable proportion of the firm's sales turnover. This is a difficult task in a context where selling prices are kept stable, or even decreased, whereas some costs increase continuously (especially raw materials and wages). Hence, the plant director wishes to keep production costs below 70% of the firm's sales turnover (this ratio is currently equal to 65.8%).

The production costs include:

- Cost of raw materials consumed
- Employees' wages and social charges
- Machine costs
- External expenses

2. Organization

The plant is running 12 months a year. The production process is handled by two workshops. One is in charge of cutting textiles, the other assembles the products. Employees are specialized by workshops, not by products.

2.1. Procurement

The procurement department is in charge of purchasing raw materials. A total of 7 employees is required for this task. Their annual salary is equal to € 22,000 (exclusive of social charges). Purchasing prices are negotiated with suppliers by the headquarters' purchasing department.

2.2. Cutting workshop

This shop is highly automatized. 17 machines are currently in order. These machines run 51 weeks a year, 10 hours a day. This corresponds to a total annual capacity of 2,550 hours per machine. The average life of a machine is 10 years. They are depreciated over this period of time on a straight-line basis. The investment policy is defined by the headquarters consistently with the request of the operational departments, and within the limits set by the investment budget. The supervision of each machine requires one worker. The whole shop is supervised by one foreman. Maintenance costs of the machines amounts for € 180,000 a year.

2.3. Assembly workshop

The assembling of products is performed by a total of 542 workers. One foreman is required for every 25 workers. A total of 22 foremen is currently required.

2.4. Production management

The plant director earns a fixed gross salary equal to € 61,000. He is given a bonus based on the achievement of his goals (€ 10,000 in 20n, renewed in 20n+1). A total of 30 employees performs the various administrative tasks. The average annual gross salary of these employees is equal to € 23,000. The overall production process is supervised by a production manager. His annual gross salary for 20n is equal to € 34,000. There is also a methods office. The total cost incurred for this office is equal to € 230,000 (50% for wages including social contribution, 50% for external services).

3. Information on production

3.1. Nomenclatures for the year 20n

Products	Composition
Golf shorts	Simple cotton: 0.90 meters One A-type supply kit (buttons, lining, etc.)
Track suits	Paddled cotton: 1.30 meters One B-type supply kit (rubber band, zip fastener, etc.)
Parkas	Gore-tex: 2.10 meters One C-type supply kit (lining, zip fastener, etc.)

3.2. Production scales for the year 20n

Products	Cutting	Assembly
Golf shorts	1 machine-minute	20 labor-minutes
Track suits	3 machine-minutes	35 labor-minutes
Parkas	4 machine-minutes	58 labor-minutes

3.3. Production employees

Each employee works 35 hours a week. This represents an annual working time of 1,600 hours per employee.

From this, one must take into account:

- A 5% rate of absenteeism
- A 5% rate dedicated to break time
- A 2% rate dedicated to training

This leads to an available annual working time of $1,600 - 12\% = 1,408$ hours per employee.

Productivity is measured by dividing the theoretical working time (“scale” time) needed by the available working time. In 20n, the productivity was equal to 75%, meaning that employees have spent more time than theoretically needed to produce the output. Hence, the effective working time was equal to $1408 * 75\% = 1,056$ hours. However, for newly hired employees, the productivity rate is only equal to 70% during the first year due to inexperience.

In 20n, the average gross salary is equal to € 1,220 per month. On average, the monthly bonus for long service amounts to € 120. This bonus is acquired only during the second year of work within the company. Social charges are equal to 40% of the gross salary.

Overtime hours are limited to 11 hours per week for a maximum of 130 hours per year and per employee. Overtime hours are paid 125% of the normal rate from the 36th to the 43rd hour (included). Beyond this point, the rate increases to 150%. Currently, the average number of overtime hours is equal to 13 hours per year and per employee within the assembly shop. This corresponds to 10% of the available total of overtime hours. At the current level, the cost of overtime hours (exclusive of social charges) has been computed as follows: $(€ 1340 * 12) / 1,600 \text{ hours} * 1.25 = € 12.56$ per hour. Overtime hours could be abandoned so as to avoid redundancies.

The hiring or firing of employees has to be endorsed by the human resource department in Paris. This latter department is also in charge of the evolution of payment schemes.

For the year 20n, the annual gross salary of a foreman is equal to € 23,000.

3.4. Other elements

Other production costs include the plant rent (€ 502,000), taxes (€ 244,000), insurance (€ 240,000) and other various expenses (€ 524,000).

4. Production costs for the year 20n

The full production cost includes:

- Direct costs: materials, cutting machines costs (depreciation + supervision), assembly labor costs
- Indirect costs: all plant's indirect costs are allocated to the products based on the proportion of labor hours spend for each type of products

Overheads (headquarters' costs) are not allocated at this point.

Costs for the year 20n are as follows:

	Golf shorts	Track suits	Parkas
Materials	2.91	5.76	13.57
Machines	0.266	0.797	1.063
Direct labor	7.094	12.414	20.573
Total direct costs	10.27	18.971	35.206
Indirect costs	2.296	4.018	6.658
Total unit cost	€ 12.57	€ 22.99	€ 41.86

5. Action plans for the year 20n+1

5.1. Productivity improvement

The plant director considers the low productivity level of workers to be the primary cost driver. He is considering a productivity improvement plan to cope with this problem and that would yield a productivity rate of 80%. This would correspond to an effective working time of $1,408 * 80\% = 1,127$ hours per worker.

A special study is currently being carried out on this topic. Conclusions will not be available until late 20n+1. Hence, the average number of overtime hours will remain the same for the incoming year (13 hours per worker and per week).

5.2. Sub-contracting

The production manager is worried about the increase in forecasted sales volumes, especially with parkas. The production capacity might not be sufficient to meet the sales department's demand. A solution would consist in sub-contracting the assembling of parkas. An external supplier has accepted to handle this job for a unit price of € 16.24. Purchasing of raw materials and textile cutting would remain inside the production department. In case of sub-contracting, the entire capacity of the assembly shop could be dedicated to the production of golf shorts and track suits. However, this may lead to the firing of workers and some fixed costs may not be avoidable on the short term.

5.3. Other elements

In $20n+1$, the cost of plant rent, maintenance, research and development, insurance and other external charges should remain stable.

Required work:

- 1) Recompute the unit cost of each product for the year $20n$ by using nomenclature and production scale data**
- 2) Evaluate the amount of resources required for the cutting shop for the year $20n+1$**
- 3) Evaluate the amount of resources required for the assembly shop for the year $20n+1$**
- 4) Decide whether to sub-contract the assembly of parkas or not**
- 5) Establish the monthly production schedule and prepare a global and monthly budget for $20n+1$**