Chapter 5

The development of sales order processing

5.1 Information Flow and Database

In figure 5.1, the information flow and database of the company in this case study clearly shown. When starts from the marketing analysis, the information support the marketing analysis are both from the sales reports and distribution functions. The information from the sales reports and distribution will be considered as the data of the analysis so it would be essential for the marketing to get the most accuracy and up to date data.

After the marketing analysis, then the yearly production is planned which is supported by the information from the marketing analysis and the distribution. These two sources are important for the decision making of the production planning. Besides that, the capacities of the factories will also be considered for the yearly production plan.

Once the yearly production plan is established, the master production schedule will be made according to the information from the yearly production planning. Then the phase of production will start with the support of the master production schedule.

From the information flow, there is links and relationship between each step of the sales order processing and the flows of information. In order to improve the sales order processing in this case study, the first and most important is to improve the information flow.

The information flow needs to become more effective and efficient. The data must be accurate, up to date and securely kept for any staffs who would

need the data to support their activities. Besides that, there must be a better system for the flow of information since the latest information the company gets, the more it can utilize the information for the most benefits of the whole company.

As mention before, figure 5.1 illustrates the information flow of the sales order processing in the case study. This information flow gives a clearer picture of the flow of all information that will contribute to the development of the system.

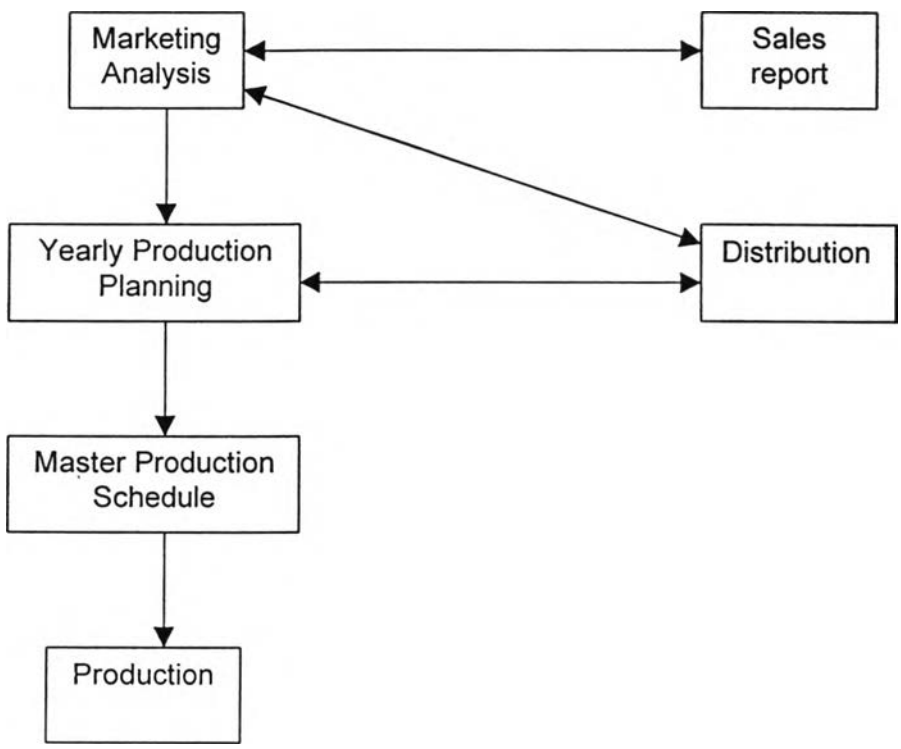


Figure 5.1: Information Flow in Ordering Process in the case study

5.2 Factors in consideration of improving the information flow

There are many ways, tools and techniques that can be used to improved the information flow of the case study. But since there are many constrains that the company needs to consider, the improvement of the system may not be as easy as it should. The factors that need to be considered are:

1. The cooperation of the management levels
   When there are changes or improvements in the company, the first to encourage and support the changes must be the management level. CEO and managers people must see the importance of the changes and realize the advantages that the improved system will benefit to the company. As a result, the staffs will be encouraged and willing to learn and understand which will reduce the opposition and resistance towards the changed system.

2. The culture and way of working of the staffs
   This includes the staffs both at the head office and the personnel in each stores. They have been working under the same circumstances and working conditions for a period of time and to change their ways of working may cause confusion and oppositions. In order to improve the information flow, there must a mutual understanding among the staffs and the advantages of implementing the system must be clearly defined. This would encourage the staffs to become willing and cooperate in learning and using the new system.

3. The cost of improving the information flow
   As the company is also facing the present economic crisis, any changes or improvement will be carefully examined since it means more cost to the company. For the case study, the company hasn't had a computer-based system. Many of the tasks are done by using paper and verbal communication and in order to improve these, many technological tools and devices may be involved. However, the company is willing to improve the

information flow but to a certain extend within a limited budget. In future, if the company recognize the benefits of having the information flow improved, the company could certainly implement a much more advance system.

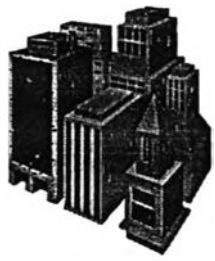
4. The training for the staffs and stores' representatives
   Once the information flow is improved, the company must provide training and seminars for the personnel involve. These include the staffs in the head office itself and also the personnel in each store. They must understand how the flows work and the importance of their parts towards the information flows of the sales order processing. When people know how important are their responsibilities towards the company, they tend to concentrate and work even better. This will also reduce the human errors that often occur in the system.

5.3 Information flow from the sales report to marketing analysis

As it was mentioned in the previous chapter, the information the support the marketing analysis is mostly from the sales reports. The sales reports are usually sent to the head office in 3-4 days or weekly by mail. The form of the sales report consists of:

1. Product label
2. The date of the products sold
3. The name and location of the store
4. The personnel who collect the label and report to the head office

Presently all this information are sent to head office by mail which cause many problems such as delayed mail, not accurate data, etc. It is necessary to remember that any changes or improvement of the information flow in this stage must not be too costly and too difficult for the staffs in each store to learn since they are from different background and level of education.



Daily: Before the department stores open

- Check the status of the products and stocks in the stores
- Make summary of customers' sales, make summary reports of the sales of each product and note the best selling products.

Department stores, Stores

Fax all the information by 10.30 a.m. to the head office. In future we may be link the data through the phone line and load all the data needed to the head office once a day instead of fax.

Head office

Head office: stock database

- Update all the data that receive from all department stores
- Record all the summary of customers' sales and the sales of each products to keep track and transfer the products that are needed at any stores when they are out of stocks
- Keep track of the production plan from the factory in order to make the right marketing plan. Also revise the production planning in case of increasing or decreasing the manufacturing of any products if necessary.

Computer online (WAN) between the head office and the factories

Factory

Factory: database

- Update the production status, online the production planning monthly (the manufacturing date, the end of each LOT)
- The shipment and transportation schedule to the customers in order that the head office could cooperate with the factories
- Check daily status of the stocks which are:
  1. Finish goods
  2. Work in process
  3. Raw materials

Figure 5.2: the information flow from stores to the head office

The suitable information flow improvement between sales report from the department stores or stores and the head office (marketing analysis) is using a fax to send all the information about sales, customers, etc. The steps of sending the information include:

1. At the end of each day, the personnel in each store will collect all the label of the product that has been sold and then stick them on the sales report form. Then the next morning before the stores are opened, the personnel must send all the information by fax to the head office by 10.30 a.m. In this case, the company will get up-to-date information in a much shorter time. Besides that it also reduce human errors of copying the product code by hand and the cost of using the fax is reasonable.

2. When the head office receives the fax that shows all the sales reports and information that is needed, then the marketing department could start analyzing the data. The analysis will be much more accurate and based more on the recent information. Besides that, the daily data from the sales report will also help the marketing department to be able to forecast the sales of the next few weeks. This is very important since the department could implement new tools or techniques in order to make a better forecast of the production such as Distribution Requirement Planning (DRP).

5.4 Information flow from marketing analysis to yearly production planning

After the sales and marketing department got all the information and data needed, the market analysis will be done. The information and results of analysis from the marketing are required for the yearly production planning stage. From the previous chapter, the information support the production planning and the sources of the information are:

1) Capacities and capabilities of the factories

The capacities and capabilities of the factories will be re-examine each year for the purpose of planning the production. In each year, the capacities and capabilities may change due to the more or less machines or workers the company has. As this information is within the company and is yearly re-examine, so the information is always available.

2) Marketing Analysis

The results of the marketing analysis needed are from the sales and marketing department. And if the flow between the sales report and marketing analysis is improved in terms of speed and reliability, it would results in the improvement of the production planning in the same way. The production planning would be more reliable and accurate. Besides that, the process would be even faster.

3) Channel Distribution

The information about the channel distribution is also within the company and so it is easy to retrieve this data. The previous planning of the channel distribution will be used as the relevant data for the yearly production planning.

4) Marketing Research and public information

This information will support the design stage of the manufacturing. The information will be collected and analyzed by the sales and marketing department. The research is done yearly or twice a year and so the information will be prepared before hand for the production planning.

Besides improving the methods and ways of getting all the information that is needed for the yearly production planning, another thing that the company should consider would be using the new method as a tool in order to forecast the production. This method is called Distribution Requirement Planning (DRP)

system. The reason that this method is considered appropriate for the case study is because the characteristics and process of sales order fits DRP system. DRP system does not only support the production planning, it also supports the channel distribution planning.

5.4.1 Distribution Requirements Planning

Distribution requirements planning is a push system. Demand and inventory information at downstream locations is sent at frequent intervals, perhaps daily to the upstream locations. Decisions on shipments are made at the upstream locations. Orders are scheduled in advance based on demand forecasts rather than reacting to current conditions.

This system overcomes the problems of amplified demand variation and lack of a shipping plan. The shipping of distribution plan can be used to consolidate carload shipments and plan back hauling. Information including forecasts of demand and inventory levels at distribution centers (DC) is used to allocate stocks in short supply to DC and possibly to redistribute stocks among distribution centers.

The example below will illustrate how DRP system works.

Example
Source: Computer Based Production and Inventory Control, page 233

This example shows the way in which orders are planned in a DRP system based on demand forecasts. Generally, a schedule of orders planned in this way is frozen through a certain number of weeks corresponding to the demand time fence in the MPS.

Ordering policy: DRP (EOQ/time-phased order point)

Lead time: 2 weeks | Order quantity: 50

Forecast per period: 15 | Safety stock: 10

Week	Past due	1	2	3	4	5	6	7	8	9
Forecast										
Demand		15	15	15	15	15	15	15	15	15
Receipt			50				50			50
Available										
Balance	40	25	60	45	30	15	50	35	20	55
Order Release					50			50		

Consider this example, a receipt was previously scheduled for 50 units at the beginning of week 2. In week 6, the available balance would fall to zero if an order were not received, so an order for the economic order quantity of 50 is scheduled to be released a lead time of 2 periods earlier in week 4.

From the example and the explanation above, DRP system would be an alternative method in order to make better plan of the production and distribution in the case study. Using DRP system, the company wouldn't have to rely on the marketing analysis only but consider DRP method to develop a better production and distribution planning. It also helps the company to manage the entire distribution center, which in this case are the stores such as the transferring of the products between stores, the lack of products (out of stocks), etc.

5.5 Information flow from yearly production planning to master production scheduling

When the yearly production plan has been established, the information flow will reach the stage of master production schedule. As the information flow from the sales report, marketing analysis and yearly production plan become faster and more accurate, it will also influence the stage of master production planning. The information that is needed for the master production plan is discussed in the previous chapter but the sources of the information and will be discussed below:

1. Production plan
   This information is directly from the stage of yearly production planning. By improving the speed and accuracy of the production plan, it will have an impact over the master production schedule in terms of speed and accuracy too.

2. Demand data
   This information is provided from the marketing analysis and the information about the factories' capacity.

3. Inventory status
   This information concerns two types of inventory which are the inventory at the factories and the distribution centers (stores). The information about the inventory status of each store will be collected together with sales reports and then send to the head office. As the flow between the sales report to the marketing analysis stage is improved, the information about the inventory status in each store will be sent in much shorter time and more up to date and accurate. Another inventory status is the ones at each factory. This information will be kept in the database and up dated every day in order to

monitor closely the status and keep them under control. The inventory status will be essential for the master production schedule.

4. Ordering Policy
   This information is provided and could be retrieved within the company. If there is a good database system, it would safe the personnel much time and energy.

· From the explanation above, improving the information flow between the production planning and master production schedule includes the improvement of the sales report and marketing analysis flow or the way of retrieving data within the company itself. This means that the company must have a database system to support and improve the information flow.

5.6 Production

In the production stage, it consists of many activities as mentioned in the previous chapter. The information support production is mainly master production schedule and also database such as order purchase, customer approval, invoice, etc. All this information are available within the company and also depend on the information flow in the earlier stage.

5.6.1 Information flow from master production schedule to production

The flow between master production schedule to production stage consists of the information of the master production schedule itself and also other internal information, which should be in the database system of the company. This flow could be improved by developing the right database system that provides information to support any activities. Also improving the information flow in the earlier stage will have an impact on the development of this stage.

After the production has been completed, the next step is distribution. In this stage, the information that is needed to support the activities consists of:

1) Marketing analysis: which is done in the earlier stage

2) Inventory status: this information is collected in the earlier stage and should also be available in the database system

3) Internal information: other information such as customer credit, distribution planning which is done along with production planning, etc.

From the entire system of the information flow, there are three main topics that need to be improved which are:

1. Improve the way to get or retrieve data by improving the flow such as using a better communication system.

2. Create a database system that supports all sorts of activities and information flow.

3. Improve the working habits or ways of work of the staffs by training them to have more knowledge and more concentration on the works.

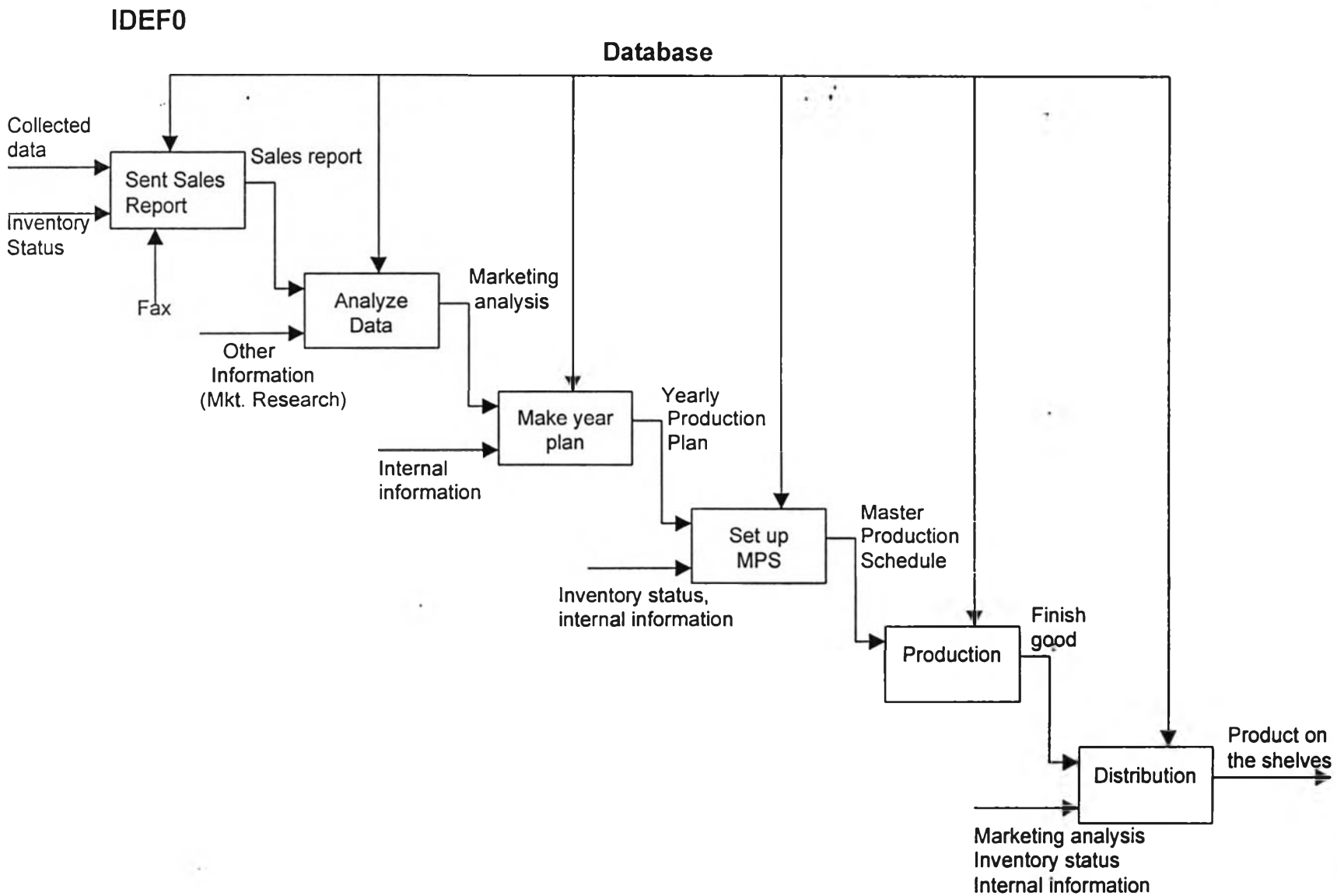


Figure 5.3: IDEF0 for sales order processing in the case study

5.7 Database

A database is a shared collection of interrelated data designed to meet the varied information needs of an organization. A database has two important properties: it is integrated and it is shared. By integrated, it means that previously distinct data files have been logically organized to eliminate redundancy and to facilitate data access. By shared, it means that all qualified users in the organization have access to the same data, for use in a variety of activities.

5.7.1 Benefits of database approach

The database approach offers a number of important advantages in order to support the information system of the sales order processing in the case study. The advantages include:

1. Minimal Data Redundancy
   By implementing database approach, previously separate and redundant data files are integrated into a single, logical structure. In other words, each data item occurrence is ideally recorded in only one place in the database and redundancy is controlled.

2. Consistency of Data
   Since the database approach could eliminate data redundancy, the opportunities for inconsistency could be greatly reduced. When controlled redundancy is permitted in the database, the database system itself should enforce consistency by updating each occurrence of a data item when a change occurs.

3. Integration of Data
   In a database, data are organized into a single, logical structure, with logical relationships defined between associated data entities. This helps the users

to relate one item of data to another related item such as the user identifies the product, it will also relate to the raw material that is used to build that product.

4. Sharing of Data

   All users in the company are able to use the database since the database are designed to satisfy the information needs of each department. Besides the sales order processing system, other subsystems will also benefits from using the shared database.

5. Ease of Application Development

   A major advantage of the database approach is that the cost and time for developing new business applications are greatly reduced. At present, the case study company may not be able to implement fully the database and information system due to the huge cost and changes that are involved. But in near future, the database will leave great opportunities for the company to develop better information system and become even more competitive in market. The software will become cheaper and new applications are available to the user in a much shorter time span.

6. Uniform, Security, Privacy and Integrity Controls

   As the company using database approach, centralized control and standard procedures can offer improved levels of database protection, compared to a dispersed data file system. Each of the staff in the company will be given a login code in order to get in to the database of the company. The database will be kept secured and private within the personnel in the company only.

7. Data Accessibility and Responsiveness

   A database system provides multiple retrieval paths to each item of data, giving a user much greater flexibility in locating and retrieving data than with

inflexible data files. Retrieval of data can cross-traditional departmental boundaries.

8. Data Independence
   The separation of data descriptions from the application programs that use the data is called data independence. As a result, an organization's data can change and evolve without necessitating a change in the application programs that process the data. Previously, the traditional approach discourages users from sharing data.

9. Reduces Program Maintenance
   Stored data is usually changed frequently for a variety of reasons since new data items are typed or added in, data formats change, new storage devices or access methods are introduced, and so on. The term maintenance refers to modifying or rewriting old programs to make them conform to new data formats, access methods, and so forth. In a database system, program maintenance can be significantly reduced since data are independent of the application programs that use them.

For this case study, it has become obvious that the database is needed to support the activities and the information flow. There are enormous benefits as mentioned above. As a result, the database has been developed partly to support many subsystems including the sales order processing.

The database that is developed to support sales order processing bases on the information which is needed in the activities from marketing analysis, production planning, master production schedule, production, distribution and feedback of the reports to the head office. Before understanding the conceptual design of the database, it is essential to understand the applications of the sales order processing and how the information flows through the process. This is illustrate in the next figure.

From figure 5.1 which illustrates the information flow of the ordering process in the case study, the application of this process could be developed and the responsibility could be delegated to each person as in figure 5.4.

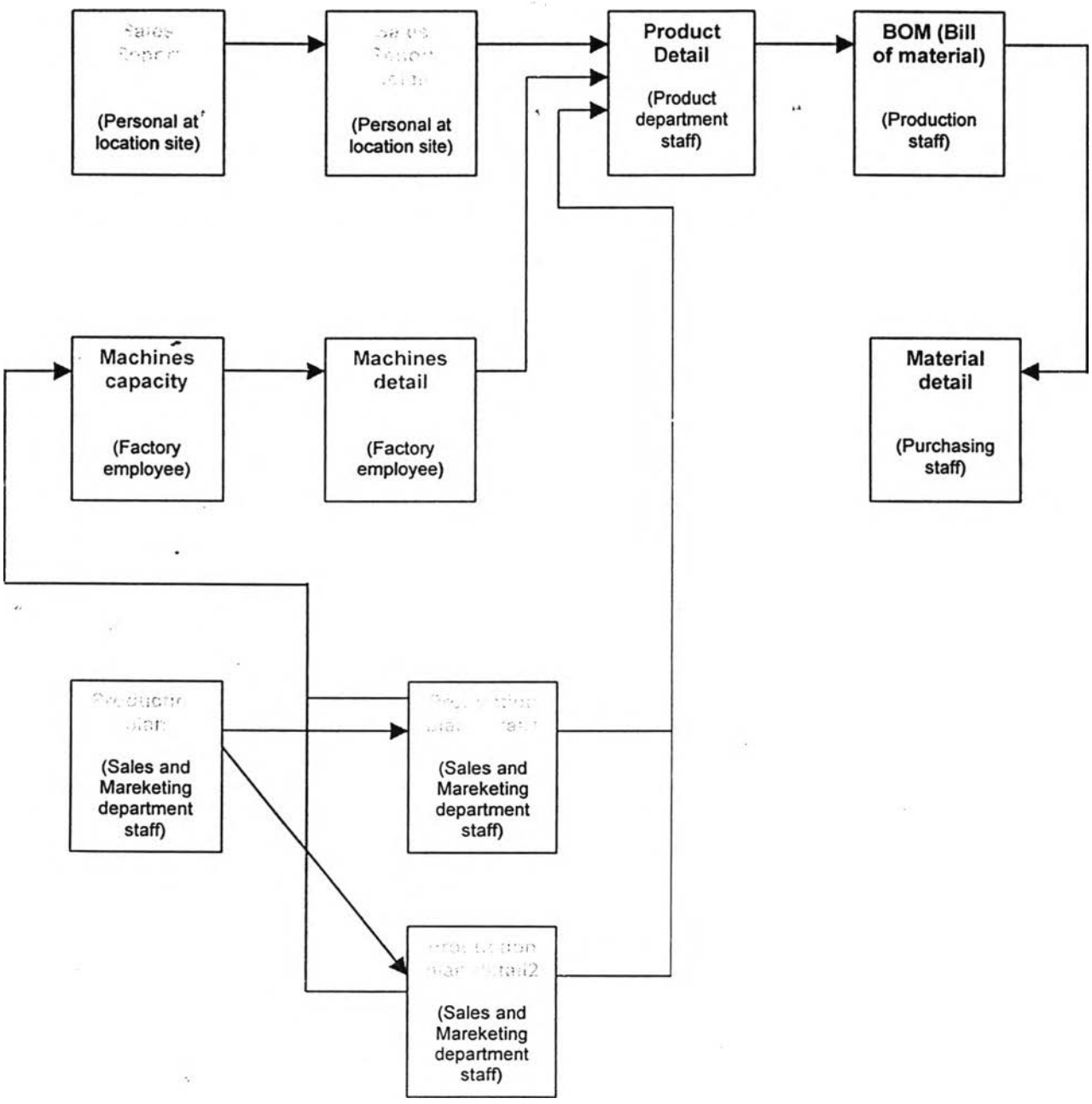


Figure 5.4: the application of the sales order processing and the responsible person in the case study

5.8 The applications of the sales order processing in the case study

5.8.1 Sales Report

The sales report application consists of the information and the format as illustrate below. The primary key that links this information to the sales report detail is "report ID".

Report ID_____

SABINA FAREAST CO., LTD

Sales report

Location site: _____

Date: _____

Customer ID: _____

Address: _____

Personal

ID: _____

Name: _____

Product grade: _____

☐ Normal Sales ☐ Promotion Sales

Total barcode: _____ pieces

Total prices: _____ Baht

Figure 5.5: the sales report form

5.8.2 Sales Report Detail

The sales report detail application consists of the information and the format as illustrate below. The primary key that links this information to the product detail form is "product ID" while this report links to sales report through the "report ID".

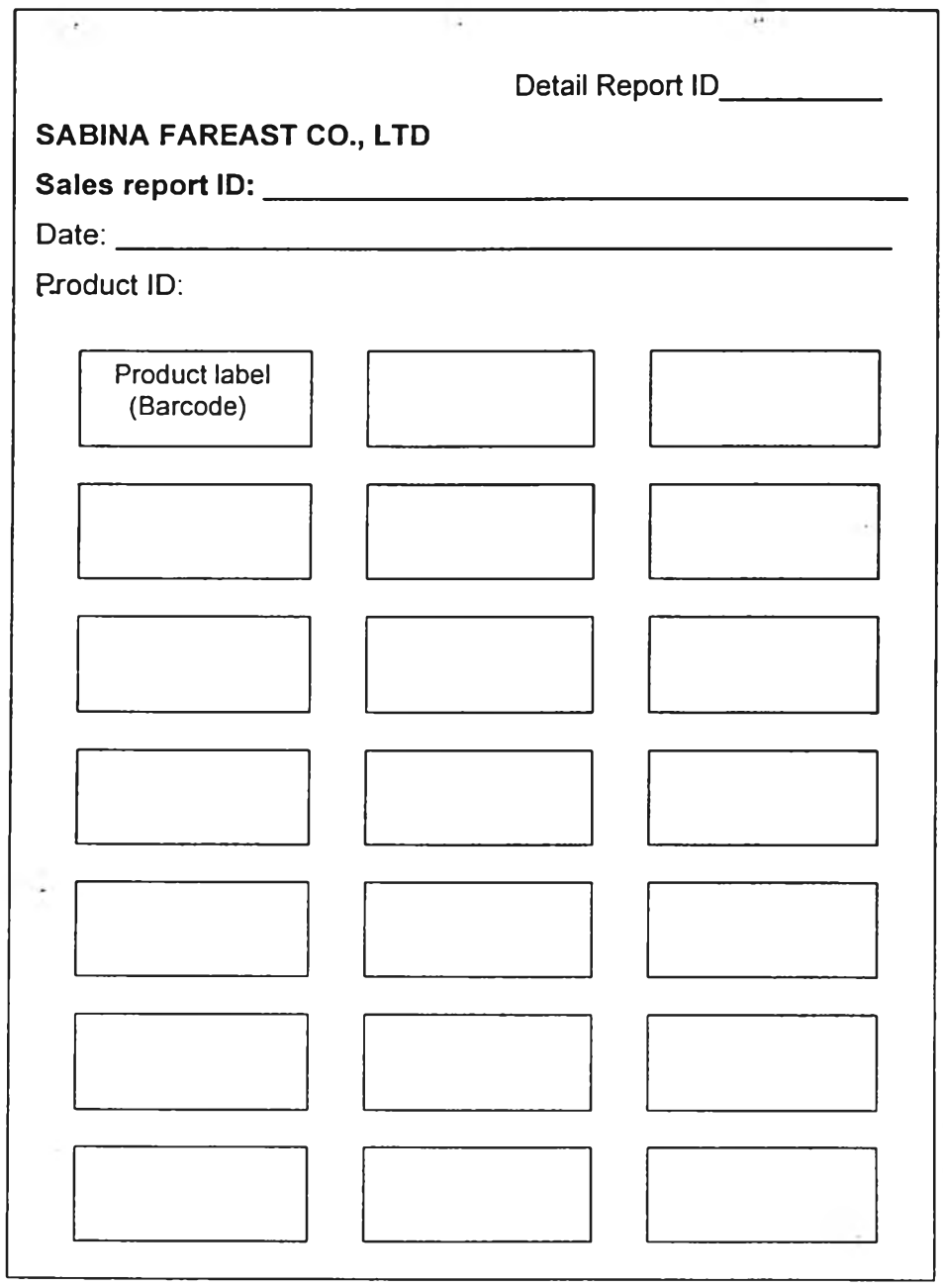


Figure 5.6: the sales report detail form

5.8.3 Product Detail report

The product detail application consists of the information and the format as illustrate below. This report links with sales report detail by using "product ID" as a primary key. Through the primary key of "product ID" from the sales report detail, users can identify what are the components include in that particular product.

Report ID_____

SABINA FAREAST CO., LTD

Product Detail report

- Product ID: (Barcode XXXXXX)

Barcode Detail:

Type of product (bra, underwear, T-shirt, slip, nightwear, etc.)_____

Collection (First bra, Pretty Perfect, Difference, Maternity, etc.)_____

Color _____

Size _____ Cup and foam _____

Support and Hook _____

Texture and material _____

Remark

D = Discount Store

B = product of grade B

Figure 5.7: the product detail form

5.8.4 BOM (Bill of Material)

The BOM (Bill of Material) application consists of the information and the format as illustrate below. This report links with product detail by using "product ID" as a primary key. Through the primary key of "product ID" from the product detail report, users can identify what are the materials and embroideries used in that particular product beside the detail in product detail report.

Report ID_____

SABINA FAREAST CO., LTD

BOM (Bill of Material)

Product ID: (Barcode XXXXXX)

Material ID: (Material that is used in this particular product)

1) _____	11) _____
2) _____	12) _____
3) _____	13) _____
4) _____	14) _____
5) _____	15) _____
6) _____	16) _____
7) _____	17) _____
8) _____	18) _____
9) _____	19) _____
10) _____	20) _____

Figure 5.8: the BOM (Bill of Material) form

5.8.5 Material Detail report

The Material detail report application consists of the information and the format as illustrate below. This report links with BOM (Bill of Material) by using "material ID" as a primary key. Through the primary key of "material ID" from the BOM (Bill of Material) report, users are able to look up the descriptions of each material ID. Every material ID will represents the types, textures, and other details of each material, which will clarify themselves for any users who, view the database.

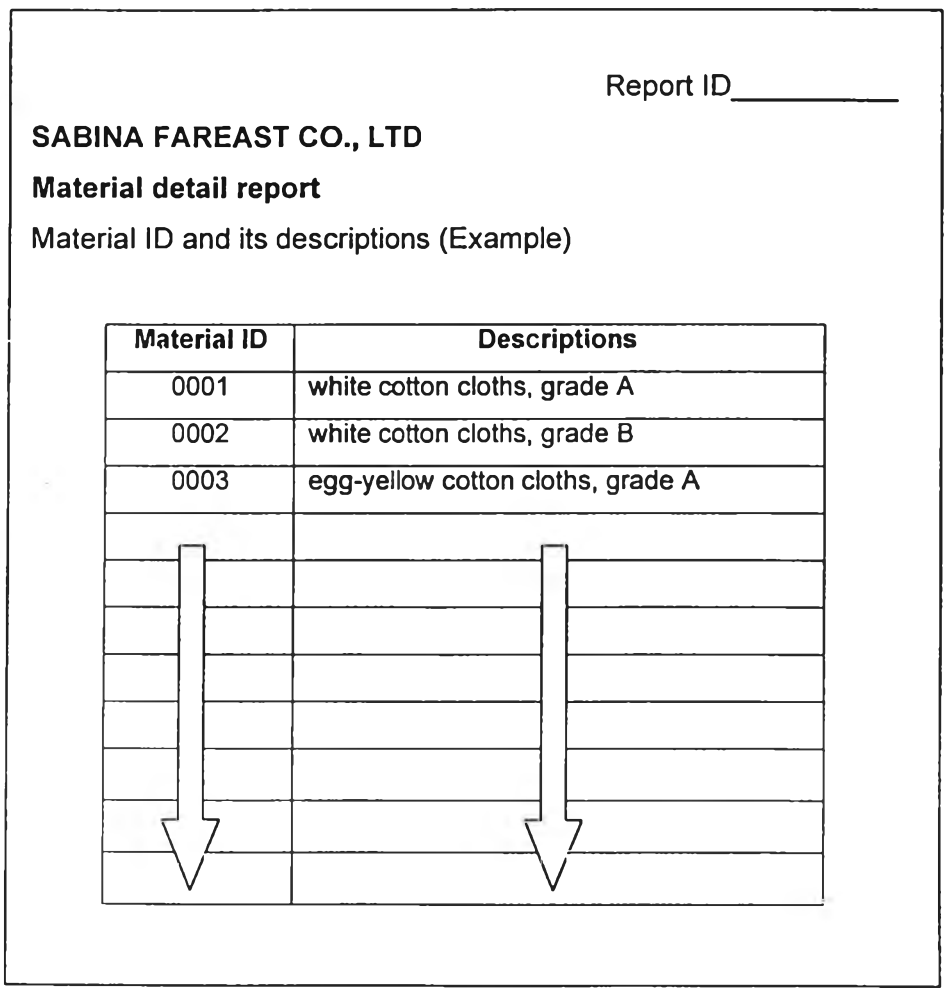


Figure 5.9: the Material detail form

5.8.6 Production Plan report

The production plan report consists of the information and the format as illustrate below. This report links with production plan report by using "product ID" as a primary key. In the production plan, there are lists of product ID, which are planned to be produced in each LOT.

Report ID _____

SABINA FAREAST CO., LTD

Production Plan Report

Date:

Factory site:

Production order

Product ID:

1) (ID of products that will be produced)

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

Figure 5.10: the production planning form

5.8.7 Production Plan detail report

The production plan detail report consists of the information and the format as illustrate below. This report links with production plan report by using "product ID" as a primary key. Each production plan detail consists of product ID, quantity and quality of the production, line process, etc.

Report ID _____

SABINA FAREAST CO., LTD

Production Plan detail report

Date:

Factory site:

Product ID: _____

- Quantity
- Quality (grade A, B, discount store)
- Line process or machine number (number of machines)

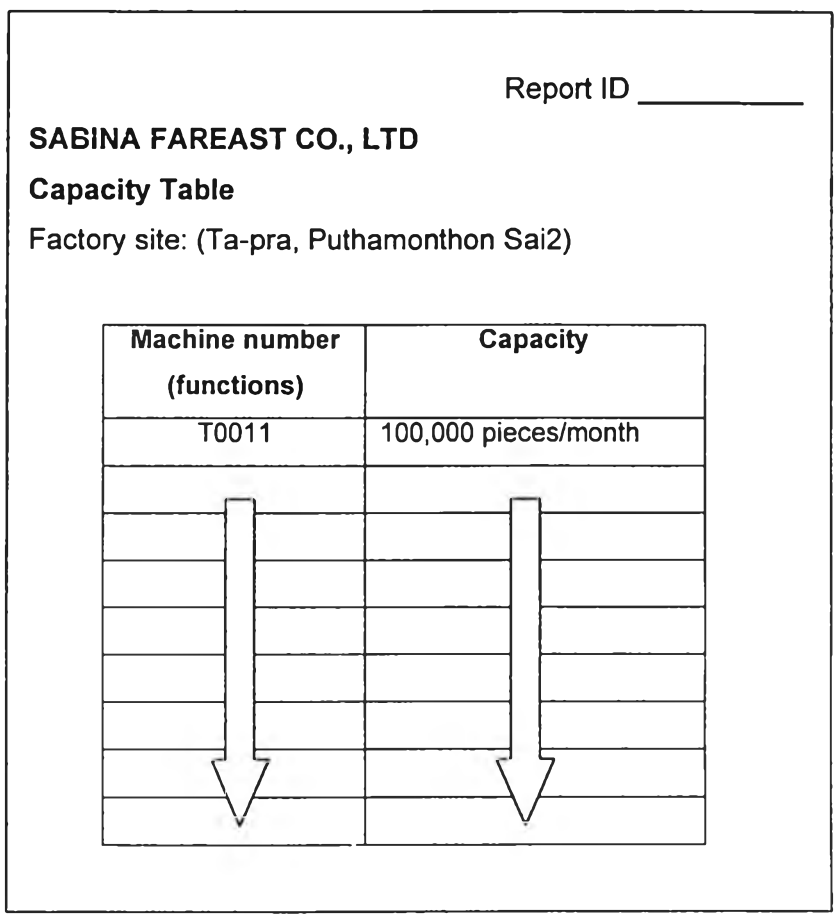
Period of production:_____

Delivery date:_____

Figure 5.11: the Production Planning detail form

5.8.8 Capacity table

The capacity application consists of the information and the format as illustrate below. This table links with production plan detail report by using "line process" or "machine number" as a primary key. The capacity table shows the capacities of each machine that is in the factories in order to help in production planning since each machine has different functions, capabilities and capacities. Besides that, each machine is able to produce components of many types of products.


Report ID _____

SABINA FAREAST CO., LTD

Capacity Table

Factory site: (Ta-pra, Puthamonthon Sai2)

Machine number (functions)	Capacity
T0011	100,000 pieces/month

Figure 5.12: the Capacity table

5.8.9 Capacity detail report

The capacity detail reports exhibit more information about the abilities of each machine. There are different types of machines with different functions in the factories, which are used differently with each type of products. So this report will assist in the production stage by giving clear description about what kind of products could be produced by which machine or line process. This report links with capacity report by using "line process" or "machine number" as a primary key and it also links with product detail report by using "product ID' as a primary key.

Report ID _____

SABINA FAREAST CO., LTD

Capacity detail report

Factory site: (Ta-pra, Puthamonthon Sai2)

Machine number (line process)	**Product ID**
T0011 (double needle)	B142563 (front hook bra) B142564 (front hook & support bra) Etc.
T0012	U112365 (bikini underwear) U156478 Etc.

Figure 5.13: the Capacity detail table

After understanding the applications of the sales order processing in the case study, the next step is to identify what information or data is needed for these applications in order to develop a database to support them. The conceptual design for the database that is involved in these applications include:

1. Customer Master File
2. Personnel Master File
3. Product Master File
4. Material Master File
5. Capacity Master File
6. Process Master File

5.9 Conceptual Design of Database

5.9.1 Customer Master File

Customer Master File is the database that keeps the information about the customers in the case study company. The information that is kept depends on the need of use within the company. The customer master file for this case study consists of:

1) Customer ID: which is the primary key of the file. The customer ID will be in a format of 5 characters which are 1 alphabet and 4 numeric ID such as A2745 ('A' identifies the classification of the customer which in this case is a first class customer)
2) Customer name
3) Customer address
4) Classes of customer: there are 3 classes of customers which are 'A' for first class, 'B' for second class and 'C' for third class customer.
5) Credit terms
6) Discount rate

Customer Master File

Customer ID: Text, (format) 5 characters
Prename: Text, 20 characters
Name: Text, 50 characters
Surname: Text, 50 characters
Address: Text, 200 characters
Tel: Text, 20 characters
Fax: Text, 20 characters
Email: Text, 50 characters
Class of customers: Text, 1 character
Credit terms: Text, 20 characters
Discount rate: Integer, 10 characters
Contact person
Prename: Text, 20 characters
Name: Text, 50 characters
Surname: Text, 50 characters

Figure 5.14: Customer Master File

For the customer master file, the person who is responsible to complete the information are:

1. Sales and Marketing officer: This person will be responsible to update, fill in or delete all information in this master file except the information about the Credit terms and discount rate which will the accounting person's responsibility.
2. Accounting staff: This person will be responsible for the data about the credit terms and discount rate. This two information will depend on the class of customers which is identified by the sales and marketing officer.

5.9.2 Personnel Master File

Personnel Master File is the database that keeps the information about each personnel in different location sites throughout the country. Since the personnel are ones who contact directly with individual customers of the company, it is essential for the company to keep tracks and records about them in order to evaluate, provide necessary training or promote them. The personnel master file for this case study consists of:

1) Personnel ID – this is the primary key. The ID will be in a format of 5 characters which are 5 numeric ID such as 11235 (the first two numeric '11' identify the region of the stores)
2) Personnel information (including name, surname, birthday, nationality, address, etc.)
3) Employment starting date
4) Salary
5) Training record
6) Location site: include head office also

Personnel Master File

Personnel ID: Text, (format) 5 characters
Prename: Text, 20 characters
Name: Text, 50 characters
Surname: Text, 50 characters
Address: Text, 200 characters
Tel: Text, 20 characters
Birthday: Date, dd/mm/yyyy
Nationality: Text, 50 characters
Education: Text, 100 characters
Employment starting date: Date, dd/mm/yyyy
Salary: Integer, 10 characters
Location site: Text, 50 characters
Training record: memo, 300 characters

Figure 5.15: Personnel Master File

For the personnel master file, the person who is responsible to complete the information is the human resource staff. This person will take responsibility to fill in, update and delete all information that concerns the personnel in the company such personnel records, salary and also the training course that has been achieved.

5.9.3 Product Master File

Product Master File is the database that keeps the information about products, the case study produces. This information provides the details about the components of the products in which distinguish each product from one another. Besides that it also provide information that links with raw material uses in production. The product master file for this case study consists of:

1) Product ID: this is the primary key. The ID will be in a format of 8 characters which are 2 alphabets and 6 numeric ID such as BP112356 ('B' identifies that the product is a 'bra' while 'P' identifies that it is 'Pretty Perfect collection')
2) Type of product and Collection
3) Color, Size and specific details of the pattern
4) Tape of material and embroidery including material ID
5) Grade of product
6) Cost
7) Selling price

Product Master File

Product ID: Text, (format 8 characters)
Type of product: Text, 30 characters
Collection: Text, 30 characters
Color: Text, 30 characters
Size: Text, 10 characters
Cup: Text, 20 characters
Hook: Integer, 2 characters
Foam: Text, 20 characters
Support: Text, 20 characters
Type of support: Text, 30 characters
Material ID: Text, (format 7 characters)
Texture: Text, 30 characters
Embroidery: Text, 50 characters
Grade of product: Text, 2 characters
Cost: Integer, 7 characters
Selling price: Integer, 7 characters

Figure 5.16: Product Master File

For the product master file, the person who is responsible to complete the information are:

1. Product division staff: This person will take responsibilities about all information that concern product ID, type of product and collection of the product.
2. Production staff: This is the person who takes care about the raw materials and all the components of each product. Therefore this person will take

responsibility for all other information about the components of the products, including the cost.

3. Sales and Marketing officer: This person will be responsible for the information about the selling price, which is usually will set by the sales and marketing department.

5.9.4 Material Master File

Material Master File is the database that keeps the information about the raw materials that are used in producing the products from the case study including the supplier for them. This information will support the activity of purchasing raw materials and creating bill of material (BOM). The material master file for this case study consists of:

1) Material ID: this is the primary key of this file. The ID will be in a format of 7 characters which are 2 alphabets and 5 numeric ID such as NY14567 (the first 2 alphabets identify the type of material which in this case is 'Nylon')
2) Type of Material: (Cotton, Nylon, Lycra, Polyester, etc.)
3) Texture color
4) Texture description
5) Supplier
6) Purchasing price

Material Master File

Material ID: Text, (format) 7 characters
Type of material: Text, 20 characters
Texture color: Text, 30 characters
Texture description: Memo, 300 characters
Material supplier: Text, 50 characters
Address: Text, 200 characters
Tel: Text, 20 characters
Purchasing price (price/yard): Integer, 20 characters
Contact person
Prename: Text, 20 characters
Name: Text, 50 characters
Surname: Text, 50 characters

Figure 5.17: Material Master File

For the material master file, the person who is responsible to complete the information are:

1. Production staff: This person should be the same person who takes care of the information about the components of the products. He would be the best person who knows the details of each component. He will be responsible for the information about the material and texture.
2. Purchasing staff: This person will take responsibility for the information concerning the suppliers and the contacts including the purchasing price since he is the person who deals with the suppliers directly.

5.9.5 Capacity Master File

Capacity Master File is the database that provides information about the capacity of each machine in the factories both in Ta-Pra and Puthamonthon Sai2 site. It will also describe the type of machines and some basic functions, which could for example help the company to plan the production rightly according to its capacity. The capacity master file for this case study consists of:

1) Machine ID: this is the primary key of this file. The ID will be in a format of 5 characters which is 2 alphabet and 3 numeric ID such as TA154 (which 'T' identifies the location site as 'Ta-Pra', 'A' identifies the line process of that machine and '1' identifies the type of machine which is single needle machine).
2) Factory site
3) Type of machine: such as cutting, single needle or double sewing, tacking, 1 or 3 layer zigzag machine
4) Machine status, description
5) Capacity
6) Starting date
7) Maintenance record

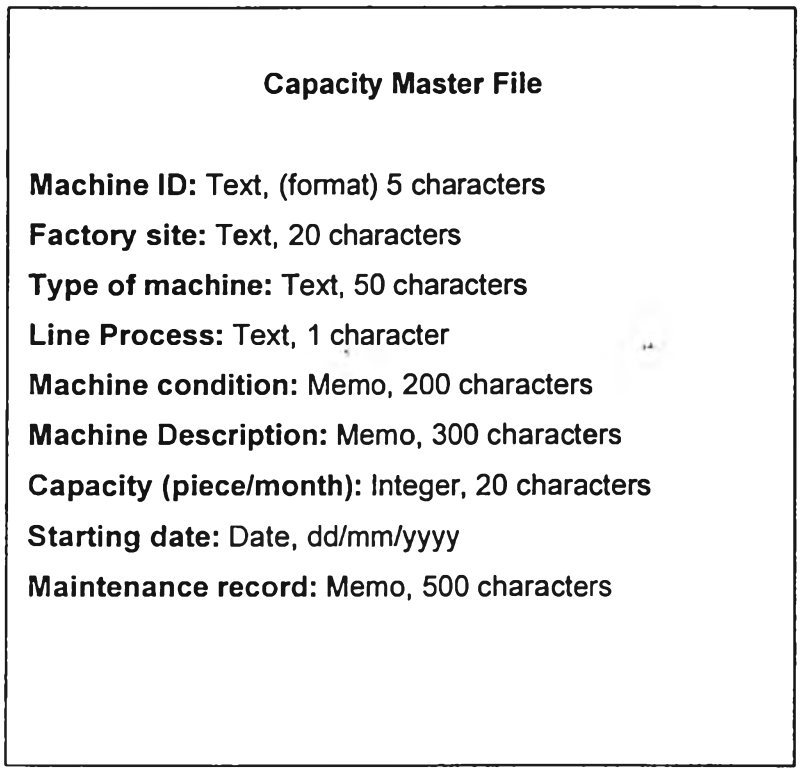


Figure 5.18: Capacity Master File

For the capacity master file, the person who is responsible to complete the information is the factory staff, which should have good computer knowledge. This person will base in the factory and he should know and be able to acquire the information about each machine which consists of the capacities, types, line process, maintenance record, etc.

5.9.6 Process Master File

Process Master File is the database that provides information about the line processes and their basic functions. Each product has different processes involved and this database could assist the sales order processing in planning the production and time estimate. The process master file for this case study consists of:

1) Line process ID: this is the primary key of this file. The ID will be in a format of 7 characters which are 2 alphabets and 5 numeric ID such as AT12456 (which 'A' identifies the line process, 'T' identifies location site and other numeric identifies what type of machine it consists of, such as '1' for single needle machine, '2' for double needle machine, etc.)
2) The machines involve in the line process
3) The type or products that are produced on this line
4) Production period

Process Master File

Line process ID: Text, (format) 7 characters
Factory site: Text, 20 characters
Line process detail (machine involved):
Memo, 300 characters
Product ID (using this line process):
Memo, 1000 characters
Production period: Integer, 10 characters

Controller
Personnel ID: Text, (format) 5 characters
Prename: Text, 20 characters
Name: Text, 50 characters
Surname: Text, 50 characters

Figure 5.19: Process Master File

For the process master file, the person who is responsible to complete the information should be the same person as the one who is in-charge of the capacity master file. Otherwise this person should work closely with the person who is in-charge of the capacity master file. He will be responsible for the information concerning the line process, the product ID that is manufactured by each line process, including the controller.

5.10 Database Management System for the case study

Database Management System is a software system that receives and satisfies all requests for data. At present, the case study company is using AS-400 hardware system which is an old system but still able to support the activities to a limited extend. Until this point which has reached the development of sales order processing, there need to be some modifications concerning the software in order to support the developed system. At present, there are many software programs with different applications available in the market but each of these programs has its own advantages and disadvantages.

There are two suitable software programs, which could support the activities in the sales order processing of the case study. The programs are Delphi-400 and Lotus Note. The difference between these two programs is described below.

1. **Delphi-400:** This software program is native with AS-400 which is the hardware system using for the time being but it is a more modern program. It means that Delphi-400 works with the same language as AS-400, which would ease the steps in developing the sales order processing. Besides that, the capability of the program concerning calculation is more efficient than Lotus Note.

2. **Lotus Note:** This software program has its own form with its own totally different language compare with Delphi-400. It is easy to use, fast in developing and is able to use on the web site instantaneously. As Internet is becoming more and more important and most companies are having their own web site on the Internet, this program would help the case study to further their business into the Internet. The disadvantage of this program is that the calculation capability is not as efficient as Delphi-400.

For the case study, it seems like Delphi-400 is suitable since the previous program was AS-400 and they both has a common language. However, there is not much calculation involved within applications or the calculation involves are only basic terms so Lotus Note would be also suitable since it would support the internet applications for the company to further its business. In this case, the company could consider using either the combination between AS-400 and Lotus Note or Lotus Note only.