

CHAPTER III

EXISTING SYSTEM AND SITUATION STUDY

3.1 Introduction

Most Thai wholesalers prefer to locate nearby each other as a group then many famous clusters have been founded by them such as ‘ Ban Mor’ which is a cluster of electronic components, ‘ Pahurat ’ which is a cluster of textile and clothes, ‘ SamPeng’ which is a cluster of all small items and accessories. Most of them sell the many same items so the competition in each market is very high and very sensitive. Usually, these companies grown up from small-family businesses and still use the tradition operation same as their parent ran the businesses. But in the last 5 year, their businesses are more sophisticated, more product and high competition, they start to recognize that they need some changes or new approaches to make their operation process are more efficiency in term of time, cost, service etc.

3.2 Company Information

This thesis has used Rungwattana 1994Ltd.(RW) which is one of Thai wholesalers in Sampeng, as a case studied company to study on Thai wholesalers’ problems and requirements to improve their warehouse’s efficiency. RW is the wholesaler company that provides household and grocery products to retailers. RW has one store in Sampeng whicht they settle there more than 30 years and another 2 buildings that are used as warehouse.

There are more than 900 items in their warehouse. They used 2 commercial buildings that locate near Sampeng as a warehouse because it is comfortable for them to deliver product to customers and Sampeng store.

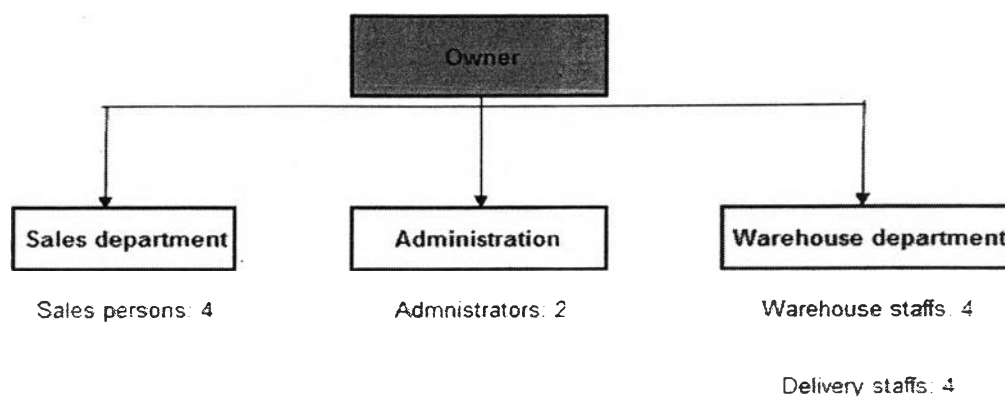


Figure 3.1-Organization chart of Rungwattana 1994 Ltd.

As illustrated in the above figure 3.1, RW has composed with 3 departments: Sales department has 4 sales persons that are responsible for sale to customer at Sampeng store and find new customers outside Bangkok.

Administration office has 2 administrators who are responsible for financial, accounting job and order products to stock in a warehouse.

Warehouse department has 4 staffs that are responsible for operate warehouse activities and check stock roughly, and the other 4 are responsible for delivery product to customers.

3.2.1 Characteristic of warehouse in this study

Warehouse in this case study is a finished good warehouse that generally performs receive-store-pick-ship. Finished products that are in transit or awaiting distribution to customers in warehouses at the production site or at the some location a distance from it. This warehouse receives product from many suppliers which can be manufacturers or importers. Warehouse stores products until they are required by customers' order then products will be shipped to customers. In other words, it can be said that this warehouse works as a distribution factory.

3.2.2 Product category in warehouse

Products or Goods which have been stored in this warehouse are grocery product that normally can be found in supermarket and grocery. Thus, range of products in the warehouse is very wide and characteristic of each category is much different. Regular products that have been stored in a warehouse can be classified by their characteristics into 10 categories:

- Office items: This category has been composed with many items that generally be used within working office. Sample of products in this category can be named as scissors, glue, clipboard and envelopes etc.
- Cooking tools: Tools that used to make or cook foods have been putted in this category such as a chopping block, a knife, a ladle and an aluminum foil etc.
- Electrical items: Characteristic of items in this category is the item that concerns to electric power supply, electrical tool or electrical parts. Sample of products in this category can be named as an electric line, a power cord and a plug receptacle etc.
- Personal care products: This category contains a product that concern to health or sanitation of human. These products can be named as a tooth brush, a razor, a cotton wool and a cotton butt etc.
- Chemical products: Characteristic of items in this category is the item that concerns to a chemical fluid or a chemical substance. A varnish, a waxy, a gaseous fuel, a shoe cleaning fluid, a dish wash and a detergent have been putted into this category.
- General household items: Items in this category are often founded in a house and used in housing activity such as cleaning, dressing and security. Some of items in this category are rubber binders, threads, brooch and a lock.
- Plastic items: Items in this category must have plastic to be their main material. More than 20% of all items in this warehouse are in this category. A plastic cup, a plastic bin, a pincher, a plastic broom and other plastic stuffs are expected to be founded in this category.
- Fabric items: Material of items in this category is a fabric. Fabric products of this category are socks, fabric hats, rugs, fabric gloves and etc.
- Mechanical tools: Screwdrivers, pincers, lubricant oil are the samples of products in this category. It means the tools that are required to operate a mechanic job such as maintenance and repairing would be included in this category.
- Miscellaneous: This category contains products that can not been classified to other category. These items have a prominent characteristic such as elastic fabrics, curtain hookers, loops, whetstones and CD cleaners.

3.2.3 Types of product's container or package

There are many types and many sizes of container that used in this warehouse because normally, container of products while they are stored in a warehouse, are as same as while they are delivered by suppliers. Although in warehouse current operation, there is no code, system or standard to indicate the types and size of containers in this warehouse, types of containers can be divided by case material into 5 types:

- **Wooden crate:** It is a slatted wooden case used for transporting or storing good. In this warehouse, some very high weight items such as padlocks are contained by this container.
- **Carton:** It is a light box or container, typically one made of waxed cardboard or plastic in which light weight items or small items are packaged.
- **Sack:** It is a container of flexible material with a seal at the top, used for carrying or storing things. In this warehouse, it is used to contain informal shaped items such as rugs, cones, plastic spoon.
- **Bundle:** It is a collection of things, or a quantity of material, tied or wrapped up together by a rope or nylon. Saving boxes, tissue box and plastic chairs are the sample of products that are tied as a group in the form of bundle.
- **Parcel:** It is a pack of item in a package. It is used to contain a light weight item which has a big shape. Sponge, plastic spoon and etc are the sample of products that are contained in a parcel form.



Figure3.2-Wooden crate



Figure3.3- Carton

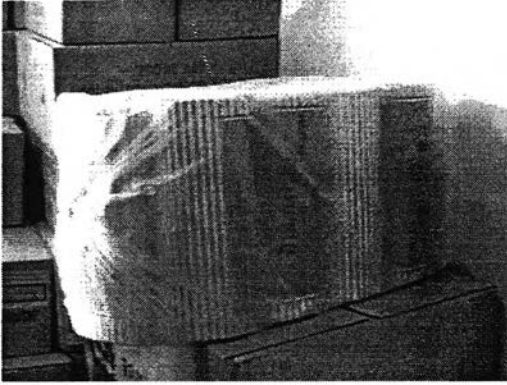


Figure 3.4-Plastic sack

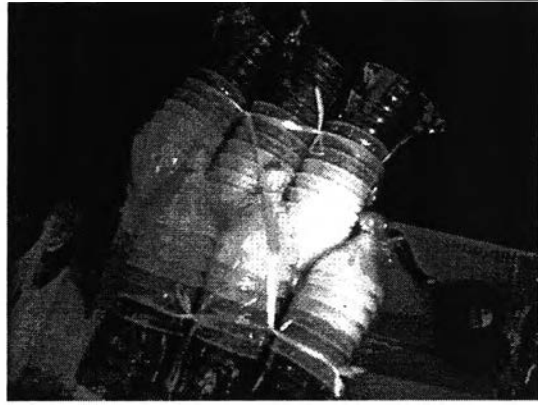


Figure 3.5-Bundle

3.2.4 Quantity of item in warehouse

As it was mentioned before, this warehouse has no such a system to record movement in and out of items then quantity of each item in a warehouse must be derived from other documents or calculations.

To find an average quantity of each item in warehouse concerns with 3 files from administration. They are an invoice from suppliers, a receipt and a purchasing recording book of administration. They provide useful information about delivery date, quantity of each item at receiving and ordering date. Ordering date is a date that administrators order items from suppliers and it is recorded in purchasing recording book of administration. Delivery date is a date that suppliers deliver items to a warehouse and it shows in an invoice from suppliers. The data from these documents is shown in the appendix A.

Figure 3.6 illustrates the explanation of lead time, safety stock, delivery date, received quantity and average quantity of product in a warehouse. X axis from fig 3.6 is a date on working day and Y axis is quantity of product in a warehouse.

Fig. 3.6 shows the movement of the quantity of products in each day from one delivery date to another delivery date and so on. From the figure 3.5, it clearly shows that average quantity of each item in warehouse is calculated from this equation:

Average quantity of each item in warehouse (Q) = (Average receiving quantity (R))/2 + Safety stock (S)

Average receiving quantity (R) is derived from received quantity in invoices from suppliers. In this thesis, Average received quantity (R) of each item is the

average value of the first 5 received quantity in invoices from suppliers during May to August 2004. This data is shown in table A.1 in the appendix A.

Before this study, there is no record about safety stock of each item in warehouse. Thus, data collection to find the safety stock of each item had operated during May to August 2004. The data collection had been done by administrators. Before administrator orders item to store in a warehouse, warehousing staffs need to check the stock of that item and record it in a purchasing recording book of administration during May to August 2004. Safety stock of each item derives from the average value of the first 5 records of item's stock before administrators made an order of that item during May to August 2004. This data is shown in table A.3 in the appendix A.

From the calculation of above equation, average storage quantity and maximum storage quantity of each item in warehouse shows in table B.3 in the appendix B. Total average quantity of all items in warehouse is 6,162 units during May to August 2004.

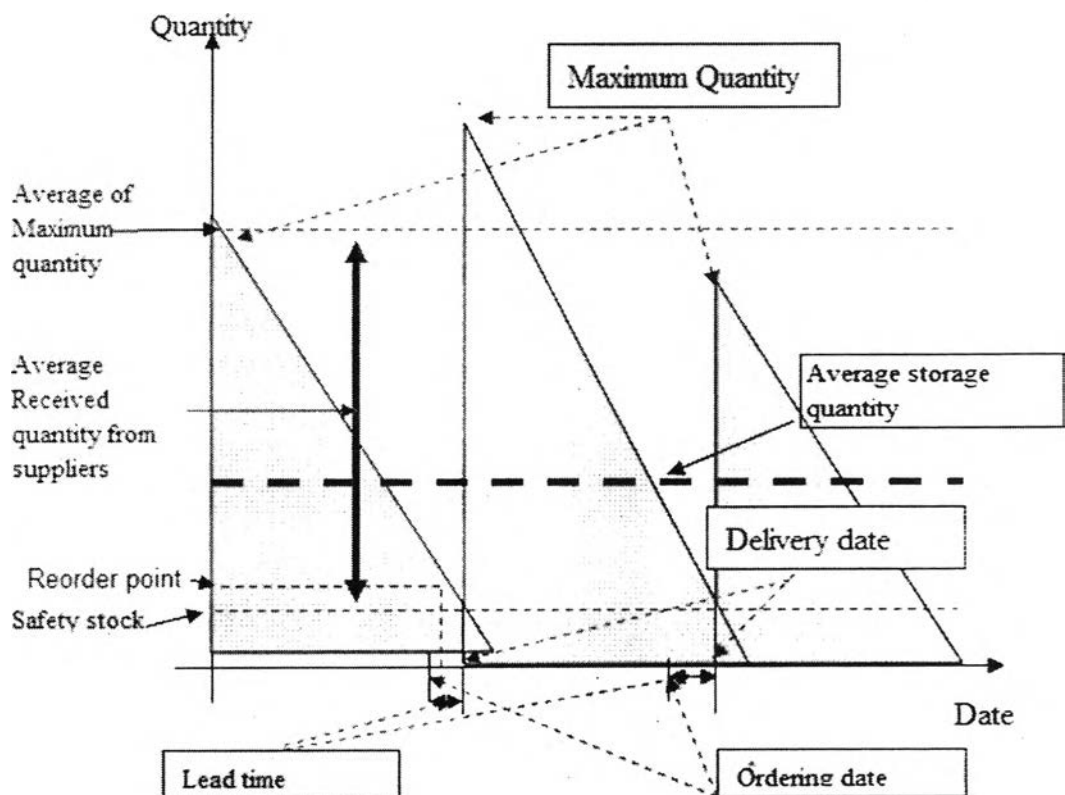


Fig 3.6- Illustration of Average quantity of each item in stock

3.2.5 Warehouse layout

The company uses 2 commercial buildings as a warehouse and an office. The first building has 7 floors but the first floor is an administrator office and the third floor is a bedroom for the owner of the company. The second building has 6 floors. Layout and detail of each floor in first and second building illustrates in appendix F.:

	Total area (Square meters)	Avaiable area (Square meters)
Building No.1		
1st floor	43.7	26.16
Floated floor	43.7	37.56
2nd floor	44.84	27.76
3rd floor	not used	not used
4th floor	44.84	38.7
5th floor	44.84	36.47
6th floor	26.6	25.12
Building No.2		
1st floor	43.7	35.74
Floated floor	43.7	33.91
2nd floor	44.84	30.94
3rd floor	44.84	39.04
4th floor	44.84	39.04
5th floor	44.84	39.6

Table 3.1- Data of total area and available storage area of each floor

3.2.6 Warehouse equipment

In this warehouse, warehouse equipment can be divided into 3 types. There are handling equipment, storage equipment and packing equipment. Detail of each equipment in a warehouse show following this:

3.2.6.1 Material handling equipment

In this warehouse, there are only 2 types of material handling equipment that are used regularly, which are 2-Wheel Hand trucks and Lifts.

(A) 2-Wheel Hand truck: Purpose of use: 2-Wheel Hand truck is used to deliver product from a warehouse to a selling store or to a customer vehicle. Thus, it can be said that it is used for shipping activity only.

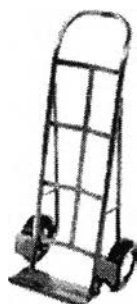


Fig.3.7- Example of wheel hand truck

Dimension: 8"Solid Rubber Wheels, 12-1.2 inches Wide X 44 inches Height, 7X14 inches Toe Plate.

Quantity: 6 trucks.

User: Delivery staffs

Area of use: First floor of each building and outside area.



Fig.3.8- Picture of a delivery staff is loading items into 2-wheel hand truck in front of a building.

(B)Lift: Purpose of use: There is one lift in each building in a warehouse. It is used to move item in and out from storage area. It is very useful in this warehouse because its buildings have many floors and the width of stairs is narrow compares to size of items.

Dimension: 1.10 meters Wide X 1.4 meters Length, 2.5 meters Height.

Capability: Maximum load weight 1,500 Kilograms

Quantity: 2 lifts

User: Warehouse staff

Area of use: Inside warehouse. Building No.1 from 1st floor to 4th floor and building No.2 from 1st floor to 5th floor.

3.2.6.2 Storage equipment

Wooden pallet and shelves are the only storage equipments which are used to store items in this warehouse.

(A) Wooden Pallet: Purpose of use: Most items that are contained with a big plastic sack will be stored by stacking on a wooden pallet. A wooden pallet used for storing a product that is difficult to stack or pile properly. It can carry many crates at one time. Wooden pallet is provided ease of storage and good use of cubic space. But it is never used to move an item with handling equipment.

Dimension: it is the standard size 40in x 48in, two-way pallet,

Quantity: 8 pallets

User: Warehouse staff

Area of use: Inside a warehouse at the 1st floor of the building No.2

(B) Shelves: Purpose of use: Shelves are used to store items and it increases storage capacity by good use of cubic space. Shelving is a very basic storage method that affords the user significant flexibility in the type and quantity of goods that can be stored, and at a relatively low capital investment.

Attribute: Shelving consists of four vertical posts that support one or more horizontal shelves and their size is very various. In this warehouse, shelves are made of wood and steel. There are 4 layers that can store items in each shelf but floor of each layer can not move or adjust.



Fig.3.9- Sample of Shelf



Fig.3.10- Shelf in a warehouse

Quantity: 16 shelves

User: Warehouse staff

Area of use: Inside a warehouse.

3.2.6.3 Packing equipment

In this warehouse, there are 2 categories of packing equipment. The first category is a packing tool and second category is a packing machine.

(A) Packing tool: Packing tools that are used in packing activity of this warehouse consist of plastic string, pincer, scissors, and self adhesive cellulose tape etc.

(B) Packing Machine: There is only one packing machine in this warehouse. It is a string-tight machine which used to tight a carton or bind items in a package as a bundle. It was installed at the first floor of the building no.1. The size of packing machine is 60 cm width, 110 cm length and 80 cm height.



Fig.3.11- A string-tight packing machine.

3.2.7 Current warehouse operation

The warehouse operation of this warehouse has no work instruction or standard operation document then process mapping is the only way to establish their current operation.

From process mapping, warehouse operation can be divided into 7 steps:

3.2.7.1 Inbound receiving:

Suppliers deliver items to a warehouse at the administration office after an administrator make an order. Normally, suppliers deliver product to a warehouse by a truck. Suppliers will unload items from a truck to an area at the front of an administration office. Warehouse staff will check amount of items and list of items compares with the number in a invoice. If amount and list of items are not correct, warehouse staff will inform administrators and supplier deliver person to work on it.

They will not accept items into a warehouse if it is not correct to a invoice from suppliers.

After checking amount of items on the list, quality checking will be done randomly according to memory of warehouse staffs on suppliers' prior delivery record. If quality of items is correct, administrators will take an invoice from suppliers.






Symbol	Detail	Operator	Document	Equipment
	Suppliers deliver items to a warehouse at the administration office	Supplier staff	no	no
	Suppliers will unload items from a truck to an area at the front of an administration office.	Supplier staff	no	no
	Warehouse staff will check amount of items and list of items compares with the list in an invoice	Warehouse staff	invoice	no
	Quality checking will be done randomly according to memory of warehouse staffs on suppliers' prior delivery	Warehouse staff	no	no
	Administrators will take an invoice from suppliers.	Administrators	invoice	no

Table 3.2-Procedure of receiving activity

3.2.7.2 Put away and Storage

Warehouse staffs have no identification method to identify and group a product, in order to identify the assigned warehouse keeping location. Their product recognitions relies on the suppliers markings or tags on the exterior.

Warehouse staffs use memory system which is solely dependent on human recall to identify the storage location of each item because it is simple, relative freedom from paperwork or data entry, and maximum utilization of all available space. But their memory recalls only the zone that storage location of items should be in, after that they must walk and look around to find a space to put items in.

After they identify the storage location, warehouse staffs move item to its storage location. The physical act of moving items from inspection and placing them in storage is generally lift be used for the vertical move and manpower be used for horizontal move.

Warehouse staffs place heavy items near a receiving area and light items far from a receiving area. Items are stored in shelves or stacking on a floor depends on its size and weight.





Symbol	Detail	Operator	Document	Equipment
	identify the item and its storage location by human recall	Warehouse' staff	no	no
	warehouse staffs move item to its storage location.	Warehouse' staff	no	Lift
	Looking for an available storage space	Warehouse' staff	no	no
	Warehouse staffs place heavy items near a receiving area and light items far from a receiving area. Items are stored in shelves or stacking on a floor depends on its size and weight.	Warehouse' staff	no	no

Table 3.3-Procedure of Put away and storage activity

3.2.7.3 Order picking

This activity of this warehouse starts with receiving order from customers. Orders of a warehouse come from 3 groups: The first type of order comes from the company' selling store at Sampeng. In early morning, selling store at Sampeng would call to order items and delivery staff must deliver items in there before 9 o'clock in the morning. The second type of order comes from Bangkok retailers and this group has no specific time to make an order. It depends on their demand but after 17 o'clock, warehouse would not receive an order. Usually, Bangkok retailers bring their trucks to receive items at some place near Sampeng and delivery staff must deliver items to their trucks. The third type of order comes from upcountry retailers. Normally, they would call to make an order through administration office in the morning and items have been sent to them through logistic companies.

After administrators receive order from customers or company' selling store, they will write down a customers' name, items' name and quantity to warehouse staffs. Warehouse staffs start order picking activity immediately after receiving a list of item.

Various items have mixed in each order then warehouse staffs use a single-order-picking which is the most common mean of selecting an order. One order picker takes a single order and fills it from start to finish. As it was mentioned earlier, warehouse staffs use human memory to remember the storage location of each item. There are a lot of items in this warehouse so no one really remember them all,

thus new operators spend much time on finding a storage location of items and must need support from experienced operators to tell them where to find items. Before they move items down to an office, they stack items that already been picked in a lift while they are going to pick other items. When all items in a list have already been picked, they will move items from storage area to an office area with lifts and manpower.










Symbol	Detail	Operator	Document	Equipment
	receiving order from customer	Administrators	recording book	no
	Assign warehouse staff to handle each order	Warehouse' staff	an ordering list of items	Lift
	Find storage location of each item by human recall	Warehouse' staff	no	no
	Pick item from storage area	Warehouse' staff	no	no
	Stacking picked items in a lift	Warehouse' staff	no	Lift
	Move item down to a first floor	Warehouse' staff	no	Lift
	Move item down to an office area	Warehouse' staff	no	no
	Stack items at an office area	Warehouse' staff	no	no
	Check items and amount of items with a list from administrators	Warehouse' staff	List	no

Table 3.4-Procedure of Order picking activity

3.2.7.4 Packing

In this warehouse, most of items are not fragile then packing activity is required because some products have the same destination and if they are packed at the same container or package, it will be easier and cheaper for shipping activity. Destination of shipping is the main factor to determine packing method. If the destination of shipping is a company' selling store at Sampeng, warehouse staff will bundle or tie items together with a rope before loading into a 2-wheel hand truck. But if the destination of shipping is a truck or receiving place of Bangkok retailers or a retail store in upcountry, a warehouse operator needs to pack items in a big carton and uses a string-tight packing machine to tight a carton before loading into a truck of a logistic company.




Symbol	Detail	Operator	Document	Equipment
	identify the item and its shipping destination	Warehouse' staff	an ordering list of item	no
	warehouse staffs select packing method.	Warehouse' staff	no	no
	Pack items in a carton with packing machine or tape	Warehouse' staff	no	Packing M.C. Tape

Table 3.5-Procedure of packing activity

3.2.7.5 Loading and shipping

After the destination of shipping has been identified, delivery staffs will select shipping method. Shipping method of items can be divided into 3 method depend on destination of shipping.

If the destination of shipping is a company' selling store at Sampeng, items will be sent to a store with a 2-wheel hand truck. If the destination of shipping is a truck or receiving place of Bangkok retailers, items will be sent to there with a motorcycle or a pickup. If the destination of shipping is a store of upcountry retailers, items will be sent to a logistic company with a truck or a pickup vehicle and they will be shipped to upcountry retail stores with a railroad freight car by a logistic company.

After the shipping method has been selected, the next area to look at is how these products will be loaded. Items which been shipped by 2-wheel hand trucks, are loaded by hand stacking and items which been shipped by a motorcycle or pickup, are loaded by hand stacking also.





Symbol	Detail	Operator	Document	Equipment
	Identified Shipping Destination	Delivery staff	an ordering list of item	no
	Select shipping method	Delivery staff	no	no
	Load item into a truck or equipment	Delivery staff	no	truck or 2-wheel hand truck
	Ship item to destination	Delivery staff	no	truck or 2-wheel hand truck

Table 3.6-Procedure of loading and shipping activity

3.2.7.6 Physical Inventory

Due to there is no report about amount of items in stock, there are no daily cycle counting, which needs operators to check stock regularly as their routine job. Their routine checking is when they pick an item from storage and they notice that it is nearly running out of stock, warehouse staff will inform an administrator to order an item into a warehouse. By the way, there is a periodic physical inventory which has been done once a year and its main purpose is to check quantity of stock. To do this activity, most of other functions in warehouse should be stopped until it is finished and all warehouse staff must do it all together. Normally, this activity has been done during a Thai New year festival.

Symbol	Detail	Operator	Document	Equipment
●	Stop other activities	Warehouse staff	no	no
●	Assign storage area responsibility to warehouse staffs	Delivery staff	no	no
■	Check quantity and quality of items in stock	Delivery staff	recording book	no
●	Write a report about current syock	Delivery staff	recording book	no

Table 3.7-Procedure of physical inventory activity

3.3 Problems and Causes in the studied warehouse

After studied the warehouse' operation and layout of Rungwattana 1994Ltd , these are the problems that have been found.

3.3.1 Business aspects problems

1. High excessive inventory.

- There is no system or data recording to provide information about quantity of each product and remained available storage areas in the warehouse.
- When warehouse staffs notice that items in one storage location are nearly out of stock, they will inform administrators to order items from suppliers. But some items are stored in a warehouse more than one place cause insufficient storage space. Then sometime, some of them are overlooked and unrecognized in a warehouse until some one notice it. So some items are stored in a warehouse more than they are planned.

2. Lost of plenty opportunities to sell due to product out of stock and it also has a high risk to lose customers to other competitors.

- Ordering process depends on stock estimation with looking by warehouse staffs. They have no system to record quantity of each item in a warehouse. Administrators have not recognized about safety stock and lead time of items.

3. High dead stock

- Because there is no data about items' movement to analyze and forecast demand of each items.

3.3.2 Warehouse operation problem

1. Storage capacity is not enough occasionally.

- There is no system or data recording to provide information about quantity of each product and remained available storage areas in the warehouse. Then they don't know exact amount of items in stock and they don't know their remained available storage area also.

2. Checking quality and quantity of received item has many errors and conflicts occur in this activity.

- Receiving activity has been done on the public street or at the office area which is very small and crowded. There is no specific area for it.

3. Too much time consuming and errors have occurred when inexperienced operators identify items' name and storage location.

- Because some items have no tag on their package or containers. When warehouse staff can not identify items' name, they can not decide where these items should be stored. Then, they would ask experienced operators to support them but at the present, there is only one staff which has enough experiences to do it.

4. Warehouse staffs use much time to find an available storage area for the items.

- Because there are no data to inform them about which area is available or unavailable so they must walk around storage area to look for an available area.

5. Transferring items from a receiving area to a storage location requires too much time.

- Because there is no specific aisle in storage area and many items are stacked on the floor all over the area. Thus, warehouse staffs hardly walk in a storage area so they need much time to carry items to its storage location.

6. Warehouse staffs hurt their muscle when they carry very heavy items into a storage area.

- They have not used material handling equipment to transfer items in horizontal within a storage area. They moved it by carrying so when it is very heavy, they need to use their muscle too much which is not good for their health.

7. In some shelves, it is difficult for an operator to put items into a shelf.

- Because some shelves' top layer is too high to reach and height of each layer is not fit with the size of items. Shelves that used in this warehouse are not suit to store a big item and they can not store heavy item also.

8. Warehouse staffs spend much time to pick an item from its storage location.

- They can not recall item' storage location so they use much time on walking and looking for targeted items in a storage area.

- Some items are blocked by other items because when warehouse staffs put down items in storage area, they are just looking for an available space in storage area. They have not considered about how to track and how to pick items in a storage area.

9. It is difficult to identify items' name or their tag or mark when they are in the storage area.

- Because when warehouse staffs put away items into their storage location, they had not turned the side that has tag or mark of items up to be noticed or identified easily.

10. Transferring items from storage location to a stacking area takes too much time.

- Some items are blocked by other items and most items are stacked or putted untidy all over the storage area.

11. Warehouse staffs pick a wrong item.

- Ordering list of item that administrator records from customers, is not clear. Some items are called in a warehouse different from what they are called by administrators.

Problems that have been founded in this warehouse are similar to what have been founded in other warehouses that don't have a good warehouse management. Causes of these problems must be found and eliminated with a scientific method. Figure 3.38 shows relations of problems and causes in this warehouse.

It indicated that most of the problems come from a non-reporting system, a messy warehouse layout and many operating systems that depend on human memory.

3.4 Solving method

With a successful warehouse management, the following objectives must be met:

1. Maximize the effective use of space.
2. Maximize effective use of equipment.
3. Maximize effective use of labor.
4. Maximize accessibility of all items.
5. Maximize protection of all items.

With current warehouse management, these objectives have not been met. Many problems have occurred from the current warehouse management so they prevent the warehouse to meet its objectives.

After the causes of problems have been identified, the new warehouse management must be established to bring the warehouse meet its objective and eliminate causes of the problems.

The new warehouse management has been expected to eliminate causes of the problem then it consists of warehouse fundamental method and the solving methods of the existing problems.

The solutions of existing problems is divided into 6 methods which are

1. Designing Warehouse database that record movement of items and the processing of information needed about the good stored.
2. Warehouse Layout and storage area improvement
3. Designing Location Addresses and Item Identifiers system
4. Designing stock locator system and Item Placement system to assign item to its storage location.
5. Warehouse equipment improvement

6. Designing Warehouse operation to match with a new system.

These methods have related to causes of problems and they are assigned to solve existing problems.

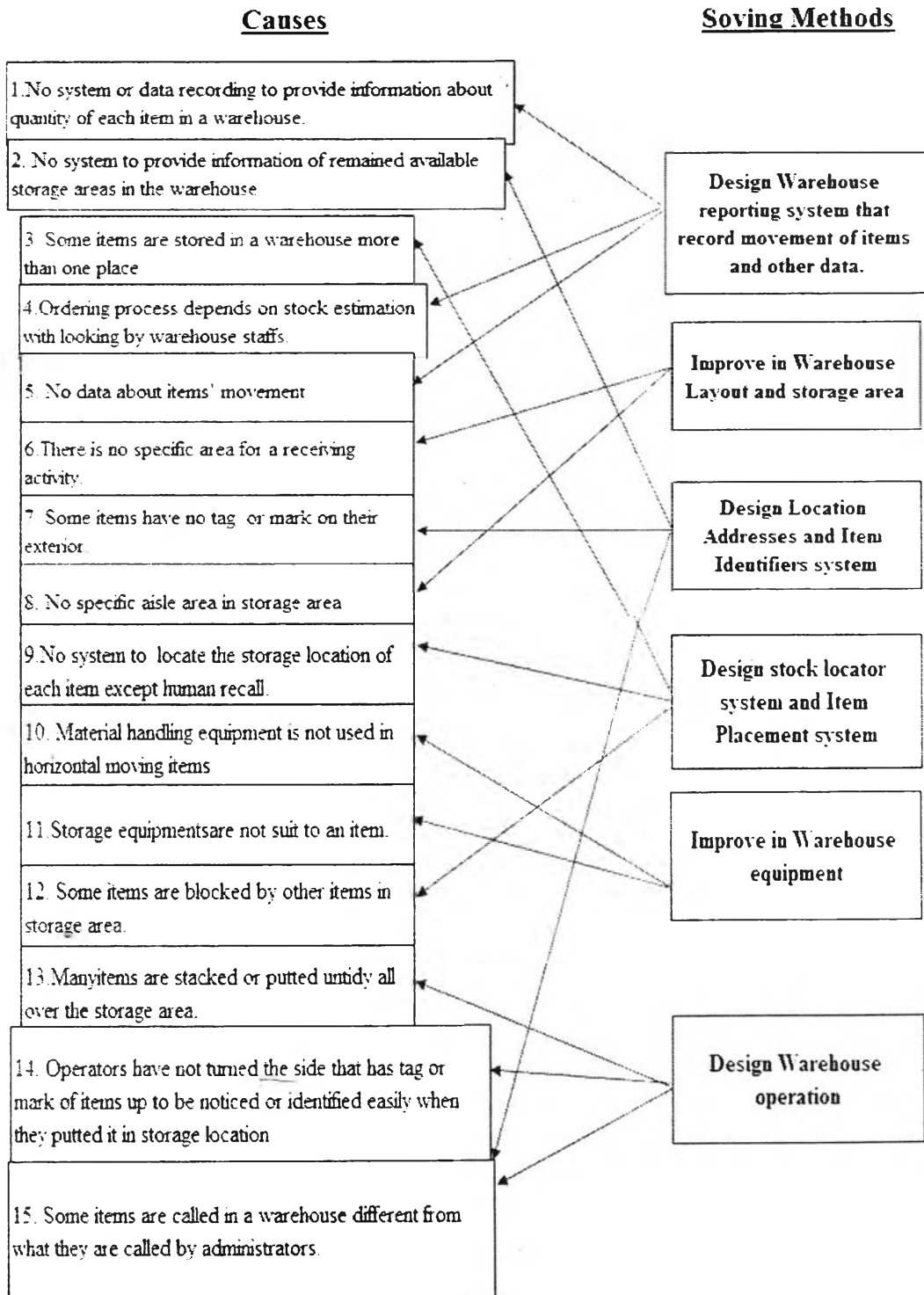


Fig. 3.12 -Relations of problems, causes and solving method

It is noticed that problems in this warehouse has strong connections to the objectives of a warehouse management. If these problems were solved by the new warehouse management, the objectives of a warehouse management would be met also.

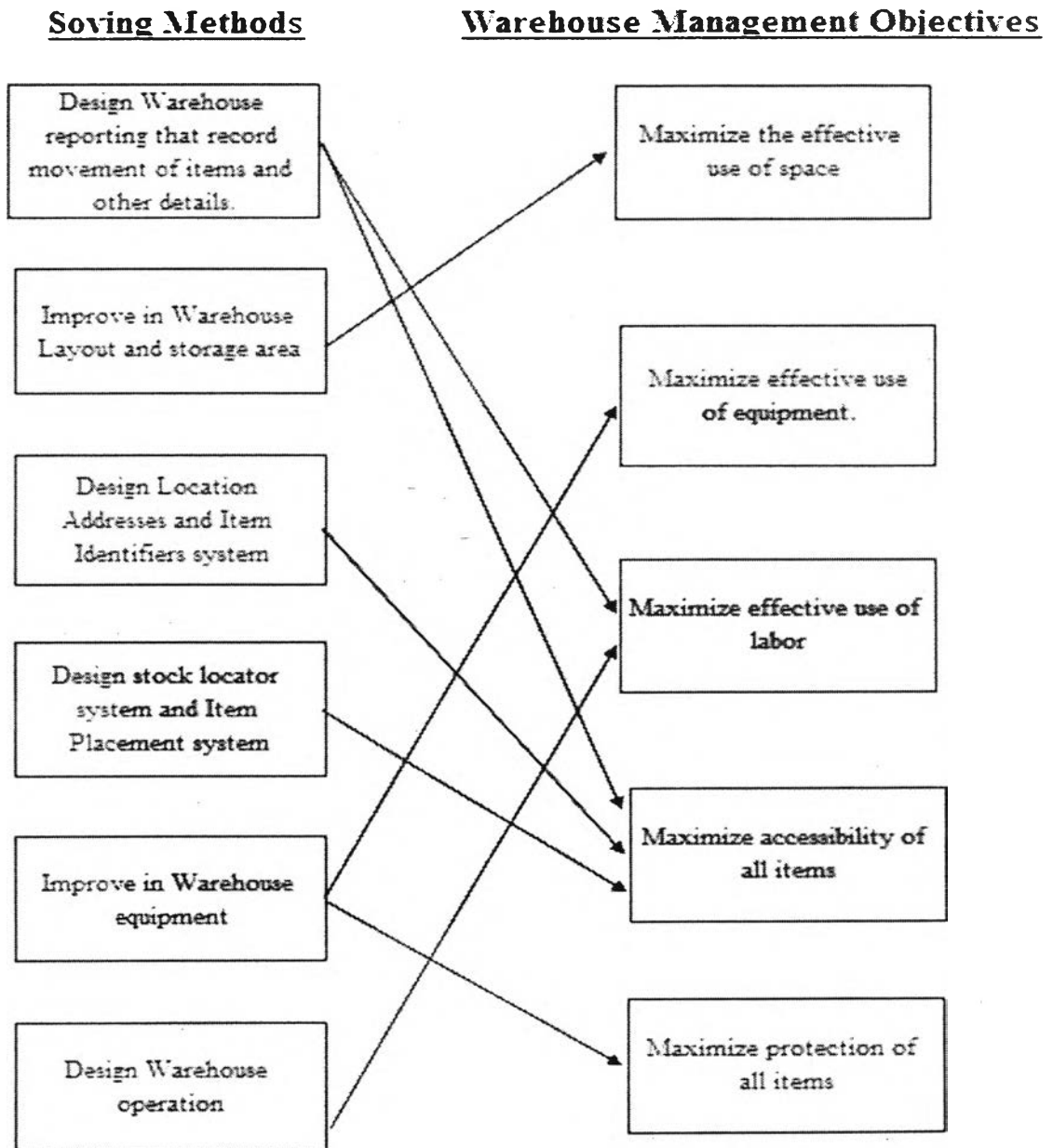


Fig. 3.13-Connections between solving method and Objective of Warehouse Management