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DESCRIPTION

ORDER MANAGEMENT SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an order management system and relates to a system capable of managing the balance of the quantity of sales and the quantity of orders.

2. Description of the Related Art

A system for determining the correct quantity of production is disclosed in Japanese Patent Laid-Open Publication No. H6-259438, for example.

Japanese Patent Laid-Open Publication No. H6-259438 has an object of reducing initial inventory to the minimum necessary by determining the correct production quantity based on order information from customers and the inventory quantity. This system is effective for determining the quantity of production in a mode in the so-called manufacturing industries in which required quantities are proposed beforehand by customers.

SUMMARY OF THE INVENTION

However, it is difficult to employ this system for management of orders in enterprises in which operation is

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performed whereby orders to producers are placed while sales are being made in stores. The reason for this is that in the above prior art system, it is a presupposition that the quantity of orders from the customers is known beforehand and a mode such as a store in which sales take place immediately is not envisaged.

An object of the present invention is to provide an order management system in which the inventory quantity can be correctly maintained by managing the ordering of products while managing sales in stores.

(1) A management system according to the present invention is characterized in comprising: a sales terminal device that accumulates actual sales results of a subject of trading and transmits these to an order management device; a warehousing terminal device that accumulates actual warehousing results of a subject of trading and transmits these to the order management device. and an order management device which, when the period from issue of an order for a subject product up to receipt of the product is taken as a lead time period, and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point, the order quantity at the current time point, that is the quantity to be received at the management-time-point, is

managed such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, inventory results quantity, scheduled inventory quantity and sales forecast quantity of the subject of trading.

That is, the order quantity at the current time point is managed such that deliveries are effected at the management-time-point such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period. In this way, the order quantity at the current time point can be suitably managed taking the quantity in inventory corresponding to the sales forecast quantity after the management-time-point as an index.

(2) to (4) An order management device according to the present invention is characterized in that, when the period from issue of an order for the subject product up to receipt of the product is taken as the lead time period and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point, the order quantity at the current

time point, that is the quantity to be received at the management-time-point, is managed such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, inventory results quantity, scheduled inventory quantity and sales forecast quantity of the subject of trading.

Also, an order management device according to the present invention is characterized in comprising: means for setting as the management-time-point a time point that is later than the current time point by at least a period from issue of an order for a subject product until receipt thereof (hereinbelow referred to as "lead time period"); means for calculating the total forecast sales quantity of the subject of trading (hereinbelow referred to as "appropriate inventory quantity"), by reference to a prescribed period constituting a criterion for determining the inventory quantity (hereinbelow referred to as "inventory determination period"), for the inventory determination period whose starting point is the future management-time-point; and means for managing the order quantity at the current time point, that is the quantity to be received at the future management-time-point, such that

the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, inventory results quantity, scheduled inventory quantity and sales forecast quantity of the subject of trading.

That is, the order quantity at the current time point, that is the quantity to be received at the future management-time-point, is managed such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period. In this way, the order quantity at the current time point can be suitably managed taking as an index the inventory quantity corresponding to the sales forecast quantity after the management-time-point.

It should be noted that the order quantity can be determined at a division (for example the head office) where this order management device is situated in accordance with order management data calculated by the order management device. In this case, management can be performed irrespective of whether or not a sales terminal device is present at the sales division.

Also, information for controlling the order quantities can be provided to the division where the sales terminal device is situated by sending the order management data to the sales terminal device and the like.

(5) A management system according to the present invention may be characterized in that the future sales forecast quantity is corrected or calculated in accordance with a comparison of the sales forecast quantity and sales results quantity up to the current time-point, and the order quantity at the current time-point is managed in accordance with this new sales forecast quantity.

More precise management of the order quantity can therefore be performed, using a sales forecast quantity taking into account the actual results.

(6) A management system according to the present invention may be characterized in that the order quantity is managed such that the forecast inventory quantity is equal to the total sales forecast quantity for the further inventory determination period.

The order quantity at the current time point can therefore be suitably managed such that the inventory quantity is equal to the sales forecast quantity after the management-time-point.

(7) A management system according to the present invention may be characterized in that management of said order quantity is performed by calculating and outputting an upper limit quantity that can be ordered.

Excessive inventory can therefore be avoided by performing ordering in accordance with a decision by a human being or the like within the frame of this upper limit quantity.

(8) A management system according to the present invention may be characterized in that the forecast inventory quantity for the entirety of subject products is calculated excluding the inventory quantity of products in respect of which future demand is not anticipated.

Order management with high precision can therefore be performed, since it is possible to determine the order quantity in accordance with the actual inventory quantity.

(9) An order management method according to the present invention is characterized in that, characterized in that, when the period from issue of an order for the subject product up to receipt of the product is taken as the lead time period and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point, management data is generated for managing the order quantity at the current

time point, that is the quantity to be received at the future management-time-point, such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, warehousing results quantity, scheduled warehousing quantity and sales forecast quantity of the subject of trading.

That is, the order quantity at the current time point, that is a quantity to be received at the future management-time-point, is managed such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period. In this way, the order quantity at the current time point can be suitably managed taking as an index the inventory quantity corresponding to the sales forecast quantity after the management-time-point.

In the present invention, the term "subject product" means the product or group of products that is the subject of management in this system. In the embodiment, an item consisting of a group of a plurality of products is taken as a subject product.

"Management data" means data that is employed for managing order quantities; in the embodiment, this corresponds to order frame data.

A "product" means an article that is specified by size, color, design, type, function and the like. This concept includes all articles such as food, clothing, and electrical products. In the embodiment, the description is given taking apparel products as the subject. This concept also includes products that are traded between enterprises. Further, this concept includes not merely products that are independently traded but also products that are traded in association with other products or services.

An "item" means a group representing a broad category of products; in the embodiment, it corresponds to one-piece items, coats, suits or the like.

A "brand" means a coherent set of one or more items.

"Medium on which a program is recorded" means a recording medium such as ROM, RAM, a flexible disk, CD-ROM, a memory card or a hard disk on which a program is recorded. The concept also includes communication media such as a telephone circuit or channel. The concept includes not merely a recording medium such as a hard disk connected to a CPU whereby a program that is recorded thereon is directly executed but also a recording medium such as this CD-ROM on

which a program is recorded that is executed after being first installed on a hard disk or the like.

A "program" is a concept that includes not merely programs that are directly executable by a CPU but also programs in source form, programs that have been subjected to compression processing, encrypted programs or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a view showing an entire system;

Figure 2 is a view showing an outline of a business model;

Figure 3 is a view showing the hardware configuration of a host computer;

Figure 4 is a view showing classified totalization processing of data;

Figure 5 is a view showing sales/inventory data;

Figure 6 is a view showing sales/inventory data;

Figure 7 is a view showing the hardware configuration of a management computer;

Figure 8 is a view showing a flow chart of sales forecast/order quantity calculation processing;

Figure 9 is a view showing a setting screen;

Figure 10 is a view showing a flow chart of the processing of preparation of an initial sales plan;

Figure 11 is a view showing initial sales plan data;

Figure 12 is a view showing a flow chart of sales forecast processing;

Figure 13 is a view showing sales forecast data;

Figure 14 is a view showing a flow chart of required order quantity calculation processing;

Figure 15 is a view showing a flow chart of required order quantity calculation processing;

Figure 16 is a view showing required order quantity data;

Figure 17 is a view showing a flow chart of judgement basis data calculation processing;

Figure 18 is a view showing judgement basis data;

Figure 19 is a view showing a flow chart of judgement processing;

Figure 20 is a view showing a flow chart of judgement processing;

Figure 21 is a view showing an inactive product list; and

Figure 22 is a view illustrating the concept of required order quantity calculation.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

1. Overall view of the system

Figure 1 shows the system layout when an order management system according to an embodiment of the present invention is applied to order management of apparel products. In this embodiment, an order management device is constituted by a management computer 10. A host computer 6 receives incoming delivery data and outgoing delivery data from the computer 2 of a distribution center that performs in centralized fashion receipt of delivery of products to warehouse, distribution of products from warehouse and storage thereof. Also, store register devices 4 are provided in stores throughout the country and deliver sales data to the host computer 6. The host computer 6 places orders with a manufacturer's computer 3.

In this embodiment, data transfer between the distribution center computer 2, store register devices 4, manufacturer 3 and the host computer 6 is performed on-line but it would be possible to deliver the data by means of recording media such as flexible discs. Furthermore, data could be printed out on paper or the like at the data transfer source and the data could be sent by data input at the data transfer goal, using such print-outs.

The host computer 6 receives data from the distribution center computer 2 and store register devices 4, performs classified totalization of the data at a prescribed time-

point every day, and updates a database 8 by communicating with the database server 9. The management computer 10 is connected with the database server 9 by a LAN and performs sales forecast using the data accumulated in the database server 8.

2. Outline of the business system

Figure 2 shows diagrammatically the flow of products and the flow of information when the system of Figure 1 is applied for order management. 1) Supply of products from a manufacturer 19 to the distribution center 12 is performed. 2) Also, shipment of products from the distribution center 12 to stores 14 and 16 is performed. 3) Supply/shipment data showing the condition of supply/shipment of these is sent from the distribution center 12 to the Head Office 18. 4) The stores 14, 16 sell the products. 5) The stores 14, 16 send sales data to the head office 18. 6) The Head Office 18 makes a sales forecast based on these supply/shipment data and the sales data. In addition, it calculates an order quantity based on the supply/shipment data, sales data, and sales forecast. 7) The Head Office 18 places an order with the manufacturer 19 in accordance with the calculated order quantity.

3. Host computer

Figure 3 shows the hardware configuration of the host computer 6. This host computer 6 comprises a CPU 20, hard disk 22, display 24, communication section 26, memory 28, keyboard/mouse 30, CD-ROM drive 32, printer 34 and flexible disk drive 36.

The communication section 26 is provided for communication with the distribution center computer 2, store register devices 4, manufacturer's computer 3 and management computer 10. On the hard disk 22 there is recorded a program for classified totalization processing and an operating system. In addition, a database 8 is constructed on the hard disk 22. In the database 8, there are recorded product master list data indicating for example the classified totalized sales/inventory data and product prices.

The program for classified totalization processing of the data is installed on the hard disk 22 from the CD-ROM 38 using the CD-ROM drive 32. Figure 4 shows a flow chart of the program for classified totalization processing of the data.

In step S1, the CPU 20 receives the sales data (how many of which products have been sold) from the store register devices 4 of each store, the supply/shipment data (how many of which products have been received and how many of which products have been delivered) from the distribution

computer 2 and the order data (how many of which products have been ordered) from the sales forecast computer 10 and accumulates these in the database 8 of the database server 9. This processing is repeated up to the prescribed time-point (step S2).

At the prescribed time point, classified totalization of the received data is performed (step S3). Normally, this classified totalization processing is performed during the night, when no sales data or supply/shipment data are generated. In the classified totalization processing of data, the sales data from each store are totalized for each product and are recorded on the hard disk 22 as the number of sales for the current day. In the same way, the receipt data and delivery data are totalized for each product and recorded in the database 8 of the database server 9. In this way, the sales, receipt and delivery data for each day are accumulated.

In addition, for each product, the cumulative total of sales for the week in question (cumulative total of sales from Monday), the cumulative total of purchases up to the present, the cumulative total of sales and the number of items in inventory or the like are calculated. These data are recorded in the database 8 of the database server 9 (step S4).

An example of the recorded data is shown in Figure 5. As shown in this Figure, each product is specified by a combination of brand and product number. It should be noted that, in this embodiment, a plurality of products are included in a single brand and, in addition, the case where a plurality of brands exist is described.

Figure 5 shows an example of sales/inventory data accumulated in this way. The number of sales in each week is obtained by totalization for each product of the number of sales from Monday to the current day of the week in question. This Figure shows that the number of sales of the product of product No. "62421" in the first week was "0 products", ..., in the 30th week "31 products", in the 31st week "40 products" and in the 32nd week "48 products". It should be noted that the cumulative number of sales of the week in question (in this case, the 31st week) is determined on Sunday night.

The cumulative number of purchases is the cumulative total of received products for the product in question. The cumulative number of sales is the cumulative total of the number of sales up to the present. The inventory figure is the inventory calculated by: cumulative number of purchases - number of sales - adjustment number. This inventory figure is updated every day. The adjustment number is the number by

which the inventory has decreased for reasons other than sales and is for example the number of damaged products, lost products or the like. Product data of this kind are transmitted from each store.

The sale commencement week corresponds to the week in which the number of sales was first non-zero (i.e. the week in which the product was first sold).

In the database 8 there are recorded not only the sales/inventory data of the current year as described above but also the sales results data of the previous and preceding years. Figure 6 shows an example of the sales results data of the previous year. It should be noted that, although not shown, the sales results data of years preceding the previous year are also recorded in the same way.

4. Hardware configuration of the management computer

Figure 7 shows the hardware configuration of the management computer. The basic configuration is the same as that of the host computer. However, on the hard disk 54 there are recorded a program for sales forecast and a program for order management and so on.

Hereinbelow, the condition setting processing, the sales plan preparation processing, sales forecast processing and required order quantity determination processing

performed by the management computer will be described in sequence.

5. Condition setting

Figure 8 shows a flow chart of the sales forecast/order quantity calculation processing program recorded on the hard disk 52 of the management computer 10.

First of all, the CPU 50 prompts for input by displaying a condition setting screen on the display 54 (step S21). This screen for condition setting is shown in Figure 9. Using this screen, it is arranged to be possible to input, for each item, the production lead time (period required from ordering up to receipt) and the number of forecast inventory weeks.

In the item column, codes indicating items such as "PO", "VE", "CD", or "JK" are shown. In this case, "PO" indicates a pullover, "VE" indicates a vest, "CD" indicates a cardigan and "JK" indicates a jacket. The operator inputs the lead times in regard to the respective items as the number of weeks. In the Figure, a lead time of three weeks is input in respect of a pullover "PO". Also, a lead time of four weeks is input in respect of a jacket "JK". These lead times are employed when determining the quantities to be ordered.

Next, for each item, the quantity in inventory in terms of weekly sales is input in the column "number of inventory

weeks". In the Figure, it is indicated that, in the case of pullovers "PO", the quantity in inventory is to be determined such that a quantity corresponding to four weeks' sales is in inventory. In the case of jackets, it is indicated that the quantity in inventory is to be determined such that a quantity corresponding to five weeks' sales is in inventory.

The above items of information are recorded on the hard disk 52 and are employed in the processing of sales forecast/order quantity determination.

6. Processing for preparation of initial sales plan

After the conditions have been set as described above, the sales plan is calculated (Figure 8, step S215). This initial sales plan may be implemented once at the beginning of the year (or at the end of the preceding year).

Figure 10 shows a flow chart of the sales plan preparation processing. Also, Figure 11 shows a diagram for indicating the details of this data processing. These data are recorded in the database 8.

The CPU 50 of the management computer 10 acquires from the database 8 the sales results data for each week for each item over the past three years (step S71). It also acquires the sales results data in which all the items are totaled.

Figure 11 shows, in regard to a single brand, the acquired sales results of all the items and the one-piece items sales results. The sales results in regard to other than one-piece items are not shown. Figure 11 shows the sales results for the 35th week to the 52nd week (35W to 52W) and the first week to the fourth week (01W to 04W); the results for the other weeks are not shown. It should be noted that data for the other brands are acquired in the same way, but are not shown. In this Figure, "98 sales" in the "total" column indicates the sales results for the year 98 of the total for all items, "99 sales" likewise indicates the sales results for the year 99 and "00 sales" likewise indicates the sales results for the year 2000. Also, "98 sales" in the "OP" column indicates the sales results of one-piece items for the year 99, "99 sales" likewise indicates the sales results for the year 99 and "00 sales" likewise indicates the sales results for the year 2000.

Next, the CPU 50 performs a weighted averaging of the sales results for the past three years. In this embodiment, the weighted averaging is performed giving the preceding year a weight of 5, the year before the preceding year a weight of 3 and the third preceding year a weight of 2. This is because the most recent data are likely to give the most

reliable forecast for the current year. This weighted averaging of sales results is not shown.

Next, the weekly index for each week is calculated based on the sales results for each week in respect of which a weighted average has been calculated as described above (step S73). This weekly index is obtained by calculating an annual total of the sales results of each week, subjected to weighted averaging as described above, calculating the mean sales for each week, and converting these sales results for each week to the form of an index, taking these averaged sales results as 100. In other words, this item is an index indicating what degree of sales potential that week has.

If this is 100, this indicates that this week has a sales potential that is the average of the entire year for the item in question; if it is more than 100, this indicates that this week has a sales potential that is better than average. Also, if it is less than 100, this indicates that this week has a sales potential that it is weaker than the average. In the column "index" of the column "total" of Figure 11, the weekly index obtained by totaling all the items is displayed; in the column "index" of the column "OP", the weekly index for one-piece items is displayed.

Next, the operator of the management computer 10 inputs from the keyboard 60 the amount of money in accordance with

the sales plan for the year for the brand in question (step S74).

On receipt of this, the CPU 50 calculates the amount of money according to the sales plan for each week of the brand in question, summed over all the items. In this process, the amount of money according to the sales plan for each week is calculated by distributing the yearly amount of money according to the sales plan using the weekly indices (step S75). The result of this calculation is displayed in the column "01 plan" of the column "totals" of Figure 11.

Next, the operator of the management computer 10 inputs the sales ratio of each item through the year for the brand in question.

On receipt of this, the CPU 50 distributes the amount of money according to the sales plan for the year that was input in step S74 to amounts of money according to the sales plan for the year for each item, using the sales ratios referred to above (step S77). The results of these calculations are shown in the "TOTAL" row of the column "01 plan" of the column "OP" of Figure 11.

Next, the CPU 50 calculates the amounts of money according to the sales plan for each week for each item by distributing to each week, using the weekly index for the item in question, the amount of money of the sales plan for

the year for each item (step S78). However, in this embodiment, these amounts of money according to the sales plan for each week for each item are not directly employed as the amounts of money according to the plan. This is because, if these amounts of money according to the sales plan for each week for each item are employed, deviations are produced from the amount of money according to the sales plan for each week of the total for all items (amounts of money of the column "01 plan" of the column "totals"). Accordingly, it is arranged that deviations are not produced by calculating the sales ratios of the items for each week in the following way, and distributing the amounts of money according to the sales plan for each week (amounts of money of the column "01 plan") of the total for all items using this.

For this purpose, the CPU 50 calculates the amounts of money according to the sales plan for each week of the total for all items ("01 plan 1" of the column "totals") by summing, for all the items, the amounts of money according to the sales plan for each week for each of the items ("01 plan 1" of the column "OP"). In addition, the item ratio for each week ("composition ratio" of the column "OP") is calculated, from the amount of money according to the sales plan for each week of this total for all items and the

amount of money according to the sales plan for each week in respect of each item (step S79).

After this, the CPU 50 distributes the amounts of money according to the sales plan for each week of the total for all items (amount of money of the column "01 plan" of the column "totals") in accordance with the item ratio ("constitution ratio" of the column "OP") for each week as mentioned above and thereby calculates the amount of money according to the sales plan for each week in respect of each item (step S80). This is shown in "01 plan 2" of the column "OP" in Figure 11.

In this way, the total in respect of the entirety of items and the amount of money according to the sales plan for each week for each item are calculated and recorded on the hard disk 52. It should be noted that, although, in the above description, the sales plan was calculated in respect of a single brand, when a plurality of brands are being managed, identical processing is performed in respect of all of these brands. The subsequent processing is also identical.

7. Sales forecast processing

As described above, once the sales plan has been determined, processing for making a sales forecast, calculation of the required order quantity and output of the required order quantity is performed each week (steps S22,

S23 and S24 in Figure 8). First of all, sales forecast processing will be described.

This sales forecast processing program is recorded on the hard disk 52 of the management computer 10. A flow chart of this sales forecast processing program is shown in Figure 12.

This sales forecast program is executed at prescribed management period intervals. In this embodiment, management is conducted in terms of weekly units, so it is executed at the start of each week (Monday).

First of all, the CPU 50 acquires the sales results data from the database 9. It then acquires the sales results for each week for each of the items and for the entirety of the brand in question (that is, the total of items for the brand in question) up to the preceding week.

For example, if the current week is the 39th week, it acquires the sales results of the 38th and preceding weeks. The acquired sales results data are shown in Figure 13. The data of the rows "35W", "36W", "37W" and "38W" of the column "TOTAL" are the sales results data for each week for the entire brand. The data for the 34th and previous weeks are omitted in Figure 13. Also, the data of the rows "35W", "36W", "37W" and "38W" of the column "OP" are the sales

results data for each week of one-piece items. The data in respect of other items is omitted in Figure 13.

Next, the CPU 50 calculates a forecast coefficient for correcting the initial plan (step S92). In this embodiment, the discrepancy between the initial plan and the actual results is converted to the form of an index by the following expression and this is used as a forecasting index.

Forecasting index = (J1*2 + J2 + J3 + J4)/(P1*2 + P2 + P3 + P4)

where J1, J2, J3 and J4 are respectively the results one week previous, two weeks previous, three weeks previous and four weeks previous and P1, P2, P3 and P4 are the plans for one week previous, two weeks previous, three weeks previous and four weeks previous. * indicates multiplication.

In the example of Figure 13, the forecasting coefficient for the entirety of the items is calculated as 0.94. Also, the forecasting coefficients for the one-piece items is calculated as 0.71. That is, in this example, the actual results are less than the plan, indicating that the future sales forecast must be revised downwards from the plan.

Next, the CPU 50 calculates a sales forecast (revised plan) by revising the future sales plan using the calculated forecasting coefficient (steps S93, S94). In Figure 13, the

calculated sales forecast for the entire brand is indicated below the row "39W" of the column "results revision plan". Also, the calculated sales forecast for the one-piece items is indicated below the row "39W" of the column "revised plan 1".

When the sales forecasts that were calculated in this way for each of the items are totaled for all of the items, there is a possibility that the result may not coincide with the sales forecast calculated in respect of the entirety of brands. That is, there is a possibility of a discrepancy being produced. Accordingly, in this embodiment, it is arranged that this discrepancy should not be produced, by proceeding as follows.

First of all, the calculated sales forecasts "revised plan 1" for each item of each week (called the item revised plan 1 for each week) are totaled for the items and the constitution ratio for each item is calculated from this total (called the item revised plan 1 total for each week). That is, the item constitution ratio is calculated in accordance with the following expression (step S95):

Item constitution ratio = item revised plan 1 for each week/item revised plan 1 total for each week; in Figure 13, the calculated item constitution ratio is shown in the column "weekly item constitution ratio".

Next, the CPU 50 distributes the sales forecasts "revised results plan" (called the brand total revised plan for each week) for the entire brand for each week calculated by step S93 to each item, using these item constitution ratios (step S96). That is, the item revised plan 2 for each week is calculated by the following expression:

Item revised plan 2 for each week = brand total revised plan for each week * item composition ratio.

In Figure 13, the calculated item revised plan 2 for each week is shown in the column "revised plan 2".

This sales plan is revised as described above and the future sales forecast is thereby calculated.

8. Processing for calculation of the required order quantity

Next, the CPU 50 performs calculation of the required order quantity for each item using the sales forecast. Figure 22 illustrates diagrammatically the concept for calculation of the required order quantity in this embodiment. Items ordered at the current week (39th week) will be received into inventory in the 42nd week (controllable lead week) after the lead time LT. This lead time LT is set in step S21 of Figure 8.

In this embodiment, the order quantity for the current week is determined so as to have inventory matching the

forecast sales for the following four weeks when the week (42nd week) which is later than the current week (39th week) by the amount of the lead time LT for the item in question commences. What is called the forecast inventory weeks is the number of weeks for which the inventory will match the forecast sales. That is, in this embodiment, the forecast inventory weeks is taken as "4". In other words, it is arranged to ensure a inventory of an amount such as to cover sales for up to four weeks, based on the sales forecast.

Figure 14 shows a flow chart of the program for processing of the calculation of the required order quantity. In this embodiment, as the criterion for calculation of the appropriate inventory quantity, inventory of some products included in the items is not used. The reason for this is that the products included in the items include products for which future demand cannot be estimated. The result is therefore that if one attempts to control the appropriate inventory quantity including the inventory of such products (called inactive inventory), it is not possible to ensure the inventory quantity of other products that is actually required. Such products are therefore identified as "dead" products (inactive products) and are excluded from the inventory quantity in calculation.

As shown in Figure 14, first of all, inactive products are determined in step S101 and the required order quantities are then calculated by step S102 and the subsequent steps.

(1) Processing for identification of inactive inventory

First of all, the processing of step S101 for determination of inactive products will be described. A flow chart of the program is shown in Figure 17 and Figure 19.

First, CPU 50 generates basic data for carrying out the identification. Figure 17 shows a flow chart of the processing for calculation of the identification basis data for identification purposes. CPU 50 acquires results data from the database 8 of the host computer 6 for all products (step S121).

Next, the brand that is to be initially processed is selected (step S122). For example, the brand with the smallest brand number may be selected as the brand that is to be the subject of processing. Next, for the products contained in this brand, sorting is performed in order from the products of smallest sales number in the preceding week (i.e. in ascending order) within the brand in question (step S123). Figure 18 shows an example of sorted data. As shown in this Figure, sorting is performed in the order of small sales number in the preceding week for each product

constituting the brand number "162". In this Figure, the cumulative purchase number, cumulative sales number, number in inventory and sale commencement week or the like are data extracted from the database 8 of the host computer 6.

Next, the cumulative total in the order of the number of sales in the preceding week is calculated, in the sorted condition (step S124). That is, for each product, when the number of sales in the preceding week for each brand are arranged in ascending order, the total of the number of sales in the preceding week from the head of the list up to the number on the list of the product in question is calculated (this is called the brand cumulative previous week sales number). In the Figure, this is shown in the column "BR cumulative previous week sales number".

Next, the brand sales constitution ratio is calculated using the following expression:

brand sales constitution ratio = (brand cumulative previous week sales number - previous week sales number) / brand total previous week sales number.

The "brand total previous week sales number" means the total of number of sales of the preceding week for all products in the brand in question.

In another embodiment, the following expression may also be used:

brand sales constitution ratio = brand cumulative previous week sales number / brand total previous week sales number

In Figure 18, the brand sales constitution ratio is shown in the column "BR sales constitution ratio".

Next, the inventory charge, inventory weeks, consumption rate and so on are calculated (step S125). The charge is acquired from the product master list, this is multiplied by the number of days in inventory and the inventory charge is thereby calculated. Also, the number in inventory is divided by the number of sales in the preceding week to calculate how many weeks' supply is in the inventory as the "inventory weeks". In addition, for reference purposes, the consumption rate is calculated by dividing cumulative sales number by the cumulative purchase number.

Next, processing advances to step S126 and a determination is made in respect of all of the brands as to whether the foregoing processing has been performed or not. If a brand is left for which processing is still to be performed, the next brand is selected as the subject of processing (step S127) and the processing of step S123 and subsequent steps is again executed.

When processing in respect of all of the brands that are to be processed has been completed, processing for

generation of the identification basis data is terminated. In this way, identification basis data as shown in Figure 18 is generated for each brand. In the generation of the identification basis data, products in respect of which a flag to the effect that this is an inactive product has been set in the product master list are excluded. In other words, the identification basis data is compiled only in respect of active products.

When the calculation processing of the identification basis data has been completed, next, identification processing is performed. Figure 19 and Figure 20 show a flow chart of the identification processing.

First of all, in step 131, CPU 50 selects a single brand to be the subject of processing. Next, it selects a single product, from the brand in question, to be the subject of processing (step S132).

The following identification is conducted, based on the identification basis data shown in Figure 18, in respect of the product in question. First of all, a determination is made as to whether or not the development period for this product is four weeks or more (step S133). This can be determined in accordance with whether or not the result of adding four weeks to the sale commencement week in the identification basis data is less than the current week. It

is arranged that products whose development period of four weeks is not yet completed are not designated as "inactive products", irrespective of their actual sales results or the like. This is because, since the period for identification of the actual results is short, accurate identification may not be possible. This identification reference number of weeks is a number of weeks that is set beforehand.

If the development period is four weeks or more, processing advances to step S134. In step S134, a determination is made as to whether or not the number of sales in the preceding week is greater than zero (i.e. as to whether they have been any sales on not). If the number of sales in the preceding week is zero, the product in question is designated as an inactive product and is described as such in the identification column of the identification basis data (step S137). For example, in Figure 18, the product of product number 03801 is designated as an inactive product in accordance with the condition given above, and the entry "A" to indicate this is entered in the identification column.

In step S134, if the number of sales in the preceding week is not zero, a determination is made as to whether or not the inventory weeks is six or more (step S135). If the

number of inventory weeks is less than six weeks, the product is not deemed to be an inactive product.

If the number of inventory weeks is six or more, the product is deemed to be under suspicion of being an inactive product and processing advances to step S136. This is because the balance between demand in the preceding week and inventory is not particularly good.

In step S136, an evaluation is made as to whether or not the brand cumulative sales composition ratio of the product in question is less than 10%. If it is not less than 10%, the product is not deemed to be an inactive product.

If it is less than 10%, the product is deemed to be an inactive product and an entry "B" is made in the identification column. For example, in Figure 18, this applies to the product code "03330".

The reason why, even if the number of inventory weeks is large the product is not designated as an inactive product unless the brand cumulative sales composition ratio is larger than 10% is as follows. That is, this is because there are cases, with products in which the brand cumulative sales composition ratio is large, in which the number of inventory weeks may become large when the number of sales in the preceding week has fallen off due to insufficient inventory, but future demand may be anticipated.

In this embodiment, in order to distinguish products which were deemed to be inactive in view of the criterion of step S134 and products which were deemed to be inactive in view of the criterion of step S136, the former are recorded as "A" and the latter are recorded as "B".

The evaluation criteria relating to number of inventory weeks and the cumulative sales composition ratio mentioned above are respectively designated by being input beforehand by the operator.

When processing as described above has been completed in respect of a single product, next, processing advances to step S138 and a determination is made as to whether or not processing has been completed in respect of all of the products of the brand in question. If some products are still to be processed, the next product is designated as the subject product (step S139) and the processing of step S133 and the subsequent steps is repeated.

If processing as described above has been completed in respect of all of the products of the brand in question, processing advances to step S140 and a determination is made as to whether or not processing has been completed in respect of all of the brands. If some brand remains to be processed, the next brand is designated as the subject brand

(step S141) and the processing of step S132 and subsequent steps is repeated.

When processing in respect of all of the brands has been completed, an inactive product list is generated as shown in Figure 21 using the entries in the identification column and is recorded on the hard disk 52 (step S142).

Each brand manager reviews this list of inactive products (either on-screen or a print-out) and inputs his agreement that the listed products should be designated as inactive products. If such designation as inactive products is not approved by the brand manager, these products are removed from the inactive products. In this way, the CPU 50 confirms the identification of inactive products and active products.

Although, in this embodiment, the list of inactive products was confirmed by obtaining the approval of the brand manager, it could be arranged for the list of inactive products calculated by the CPU 50 to be employed without modification.

Also, although the identification of inactive products was made on the basis of the number of products, it would also be possible to conduct this identification on the basis of the amount of money.

(2) Processing for calculating the required order quantity

After the inactive products have been determined as described above, processing for calculating the required order quantity is executed in accordance with step S102 and the subsequent steps in Figure 14.

Figure 22 shows an outline of the calculation of the required order quantity in this embodiment. In this Figure, the current week which has now started is taken as being the 39th week. Also, the lead time from ordering until receipt of delivery is taken as being four weeks. That is, it is assumed that products ordered today will be delivered in the 42nd week. This lead time is set by being input beforehand for each brand and for each item.

In this embodiment, the week that is at a distance into the future specified by the lead time (in this case the 42nd week) is taken as the week that is the subject of management (the management week). This is because products ordered in the current week cannot be delivered until the week (42nd week) that is specified by the lead time has been reached.

In determining this order quantity, the order quantity is determined such that the quantity in inventory at the time point of commencement of the management week (42nd week) should be equal to the forecast total of sales for the

prescribed number of weeks ahead (the number of forecast inventory weeks). This number of forecast inventory weeks is set by inputting beforehand (see Figure 9). In this Figure, it is taken as being four weeks.

Also, the sales forecast that forms the basis for the above order quantity is revised every week in accordance with actual results. Accurate ordering can thereby be achieved.

The above processing will be described with reference to the flow chart of Figure 14 and Figure 15. First of all, the active inventory for each item of each brand and the order data etc. are acquired. That is, the CPU 50 acquires the amount of money represented by the inventory and the amount of money represented by existing orders or the like from the database 8 for the active products, from which the inactive products have been excluded, of the products belonging to each item, and totals these for each item (step S102).

Figure 16 shows an example of the data calculated and recorded on the hard disk 52. In this case, the items shown are represented solely by "one-piece" items; other items are not shown. Also, Figure 16 is illustrated based on a single brand, but similar tables are compiled for other brands also.

The current week that has just commenced is assumed to be week 39. The amount of money represented by the inventory (active products only) of one-piece items at the end of the previous week (38th week) appears in the row "week 38" of the column "inventory plan 2". Also, the anticipated delivery week and the amount of money in respect of one-piece items that are on order but have not yet been delivered are recorded in the column "awaiting delivery". In this case also, inactive products are excluded from the calculations. This Figure shows that in week 39 (the current week) one-piece items to the value of 4,235,000 yen are to be delivered and in week 41 one-piece items to the value of 23,308,000 yen are to be delivered.

Next, the CPU 50 calculates the appropriate amount of money for inventory to be targeted at the end of each week (step S103). That is, it calculates as the appropriate amount of money for inventory at the end of each week an amount obtained by totaling the amount of money of forecast sales for the number of the forecast inventory weeks ahead, from the current week. In this embodiment, the number of forecast inventory weeks is five weeks. For example, the appropriate amount of money for inventory at the end of the 39th week is the total amount of money (54,599,000 yen) of the sales forecast amount of money ("revised plan 2") from

week 40 to week 44. The appropriate amount of money for inventory for the 40th and subsequent weeks is calculated in the same way. These appropriate amounts of money for inventory are recorded in the column "inventory plan 1".

Next, the inventory in terms of amount of money at the end of the 39th week is calculated from the active inventory in terms of money at the end of the 38th week (row "38W" of the column "inventory plan 2"), the scheduled purchases in terms of money ("scheduled purchases" column) and the sales forecast in terms of money (column "revised plan 2") (step S104). That is, what the quantity in inventory would be is calculated, taking into account the inventory at the end of the preceding week and the sales forecast for the current week, if no new orders were issued. The calculated inventory quantity in terms of money (52,837,000 yen) is recorded in the row "39W" of the column "inventory plan 2".

In addition, the inventory quantity at the end of the week is calculated in the same way for the 40th and subsequent weeks, based on this inventory quantity. That is, the calculation is performed as: "inventory plan 2" = "previous week inventory plan 2" + "scheduled purchases" - "revised plan 2".

Next, the purchases amount in terms of money that is to be purchased each week is calculated from the appropriate

inventory in terms of money ("inventory plan 1") at the end of each week, the forecast inventory in terms of money ("inventory plan 2") and the sales forecast in terms of money ("revised plan 2") (step S105). This is recorded in the column "purchases plan". That is, the calculation is performed as "purchases plan" = "inventory plan 1 for the current week" - "inventory plan 2 for the preceding week" + "revised plan 2".

In this way, a "slide forwards" is effected by the amount of the lead time in terms of weeks after calculation of the purchases, in terms of money, to be made in each week (step S106). In this embodiment, the lead time is taken as "three weeks", so the data of the column "purchases plan" is recorded as the data of the column "order frame", offset to three weeks previous. In this way, the value in terms of money of the order to be placed in respect of one-piece items (5,310,000 yen) at the 39th week (current week) is obtained as the required order quantity.

The same processing is performed in respect of the other items. The same applies to the other brands also.

The data calculated in this way are for example printed out in the form of a table as shown in Figure 16 and distributed to the brand managers (step S24 in Figure 8). It would alternatively be possible for these data to be

transmitted on-line to the computer (not shown) of the brand manager. Also, they could be distributed by media such as a flexible disk.

The brand manager determines the order quantity of the products constituting each item within the range of this order frame and inputs this to the management computer 10. This order data is supplied to the manufacturer's computer 3 through the host computer 6 from the management computer 10.

Also, in this embodiment, the order quantity of the products constituting each item is determined by the brand manager within the limits of the order frame calculated as above. However, it could be arranged for CPU 50 to determine the order quantity of each product automatically in accordance with the order frame, using a predetermined criterion.

9. Other embodiments

(1) Although, in the above embodiment, it was arranged to calculate the order frame for each item, it would be possible to arrange to calculate the order frame for each product individually, by carrying out a sales forecast for each product individually.

(2) Although, in the above embodiment, the sales forecast, actual results, order frame and the like were calculated in units of weeks, it would be possible to

perform the calculations in units of days, months, years, hours or the like.

(3) Although, in the above embodiment, processing of the sales forecast, actual results, order frame was performed in terms of amounts of money, it would also be possible to perform processing in terms of number of products or the like.

(4) Although, in the above embodiment, inactive inventory was not employed as a basis for calculation of the order frame, it would be possible to calculate the order frame using all of the inventory, without distinction between inactive inventory and active inventory.

(5) Although, in the above embodiment, the description was given in terms of apparel products, apart from these, it would be possible to apply this to food or daily necessities and the like. It would also be possible to apply it to products which are traded between enterprises.

(6) In the above embodiment, in determining the order quantity, the order quantity was determined such that the inventory quantity at the time point of the beginning of the week that is the subject of management should be equal to the total of the sales forecasts for a future period equal to the number of forecast inventory weeks. However, it could be arranged for the order quantity to be determined so as to

be in a prescribed relationship with respect to the sales forecast for the period of the number of forecast inventory weeks, being for example 50% or 75% thereof.

(7) In the above embodiment, as the lead time period, a lead time is employed in a case where delivery takes place after production in response to an order. However, the present invention could be applied to pre-produced products, taking the period from issue of an order up to delivery as the lead time period.

The entire disclosure of Japanese Patent Application No. 2001-361038 filed on 27th November, 2001 including its specification, claims, drawings and summary is incorporated herein by reference in its entirety.

CLAIMS

1. An order management device for managing order quantity, characterized in that, when the period from issue of an order for a subject product up to receipt of the product is taken as a lead time period, and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point;

the order quantity at the current time point, that is the quantity to be received at the future management-time-point, is managed such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, inventory results quantity, scheduled inventory quantity and sales forecast quantity of the subject of trading.

2. An order management device for managing order quantity, characterized in comprising:

means for setting as the management-time-point a time point that is later than the current time point by at least a period from issue of an order for a subject product until receipt thereof (hereinbelow referred to as "lead time period");

means for calculating the total forecast sales quantity of the subject of trading (hereinbelow referred to as "appropriate inventory quantity"), by reference to a prescribed period constituting a criterion for determining the inventory quantity (hereinbelow referred to as "inventory determination period"), for the inventory determination period whose starting point is the future management-time-point; and

means for managing the order quantity at the current time point, that is the quantity to be received at the future management-time-point, such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, inventory results quantity, scheduled inventory quantity and sales forecast quantity of the subject of trading.

3. The order management device according to claim 1 or 2, characterized in that the future sales forecast quantity is corrected or calculated in accordance with a comparison of the sales forecast quantity and sales results quantity up to the current time point, and the order quantity at the current time point is managed in accordance with this new sales forecast quantity.

4. The order management device according to claim 1 or 2, characterized in that the order quantity is managed such that the forecast inventory quantity is equal to the total of the sales forecast quantities for a further inventory determination period.

5. The order management device according to claim 1 or 2, characterized in that the management of the order quantity is carried out by calculating and outputting an upper limit quantity that can be ordered.

6. The order management device according to claim 1 or 2, characterized in that the forecast inventory quantity for the entirety of subject products is calculated excluding the inventory quantity of products in respect of which future demand is not anticipated.

7. A management system for managing order quantity characterized in comprising:

a sales terminal device that accumulates actual sales results of a subject of trading and transmits these to an order management device;

a warehousing terminal device that accumulates actual warehousing results of a subject of trading and transmits these to the order management device; and

an order management device which, when the period from issue of an order for the subject product up to receipt of

the product as the lead time period and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point, generates management data for managing the order quantity at the current time point, that is the quantity to be received at the future management-time-point, such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, warehousing results quantity, scheduled warehousing quantity and sales forecast quantity of the subject of trading, and transmits this management data to the sales terminal device.

8. An order management program for managing order quantities using a computer, wherein, when the period from issue of an order for the subject product up to receipt of the product is taken as the lead time period and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point,

said program makes a computer perform processing to manage an order quantity at a current time point that is a quantity to be received at the future management-time-point, such that the forecast inventory quantity at this future

management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, warehousing results quantity, scheduled warehousing quantity and sales forecast quantity of the subject of trading.

9. A recording medium on which the program of claim 8 is recorded.

10. An order management method for managing order quantity using a computer, characterized in that, when the period from issue of an order for the subject product up to receipt of the product is taken as the lead time period and a time point that is later than the current time point by the amount of at least this lead time period is taken as the management-time-point,

management data is generated for managing the order quantity at the current time point, that is the quantity to be received at the future management-time-point, such that the forecast inventory quantity at the management-time-point corresponds to the total sales forecast quantity from the management-time-point for a further inventory determination period, in accordance with the sales results quantity, warehousing results quantity, scheduled warehousing quantity

and sales forecast quantity of the subject of trading, and transmits this management data to the sales terminal device.