Becoming #1 Delivery Time in the Industry

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1. Introduction

With the acceleration of the electronic equipment becoming higher in performance and smaller, importance of a fan as a measure against the heating of the electronic parts is increasing more than ever. Recent trends of the fan are to become higher in performance, high quality, short delivery time for the high performance products, and it is also important to release new products into the market early.

Customers are scheduling the production by forecasting the demand in the market, so it is very important for them to acquire necessary number of fans when they require.

Measures to comply with these needs are explaining in this section.

- Measure and accomplishment of short delivery time (immediate delivery, 3 day delivery)
- Measure and accomplishment of maintaining 100% delivery deadline observance
- Measure and accomplishment of complying with short delivery of sample product

will be explained here.

2. Measure and accomplishment of short delivery time (immediate delivery, 3 day delivery)

2.1 Start of the measures for short delivery time

Activities to shorten the delivery time started in 2003.

At the beginning, activities for immediate delivery have started as carrying appropriate inventory of the products. Shortening of the delivery time and immediate delivery of the AC fan was the beginning, and this activity became the foundation of the current short delivery time measures.

In september 2007, activities were expanded to immediate delivery of the DC fans, using the know how of the AC fan immediate delivery, which is continuing to this day.

Table 1: Measures of the short time delivery

August 2003	Started immediate delivery of the AC fans
October 2004	Started 7 day delivery of the DC fans
January 2007	Started 5 day delivery of the DC fans
September 2007	Started 3 day delivery of the DC fans
September 2007	Started immediate delivery of the DC fans

Table 2: Definition of measures of the short time delivery

Types	Definition
7 day delivery	Shipment by 7 days after production confirmation
5 day delivery	Shipment by 5 days after production confirmation
3 day delivery	Shipment by 3 days after production confirmation (AM)
Immediate delivery	Next day delivery after production confirmation

2.2 Immediate delivery

Immediate delivery of the DC fans is explained here.

2.2.1 Measures for immediate delivery

Measures for immediate delivery were intended by carrying appropriate inventory of the products, and it has started by selecting the model numbers. Standard products were selected for this condition. Out of the standard products, models with more inquiries were targeted, analyzing the past sales record.

What performed next was setting the safety inventory count. Setting was laborious since there were so many customers, but appropriate safety inventory was derived from the analysis of the past sales.

2.2.2 Scheme of the immediate delivery

Immediate delivery models have inventory frame that is not appropriated to the normal received orders, but the inventory count is different for each model, and inventory count for normal received order will change constantly depending on the order status. Therefore, sales personnel will determine the possible amount of immediate deliver at that point on the system screen, and places the immediate delivery received order.

1st day : Confirm the immediate delivery inventory
Issue received order (Sales Department action)
2nd day : Delivery

It is now possible to answer to the immediate delivery as much as possible by maintaining appropriate inventory. But no matter how much we work to keep the inventory optimal as possible, there is a limit in measure by the inventory. It becomes important to quickly reimburse the inventory, and how to deliver in as short time possible when the inventory is not enough.

We have setup a scheme to perform production and delivery with minimum of 5 day lead time from receiving the order.

1st day : Issue received order (Sales Department action)
2nd day : Generate production plan system
(factory action from here) Check if possible
3rd day : AM: Generate production order system
PM: Start parts preparation (machine setup)
4th day : Start production
5th day : End production. Stocked, delivery.

2.2.3 Accomplishment of the immediate delivery

As shown in Fig. 1, the part that showed most accomplishment was sales by agencies.

There are request for multiple model, short delivery from the agencies that carry many customers. Customer satisfaction has greatly increased by the immediate delivery.

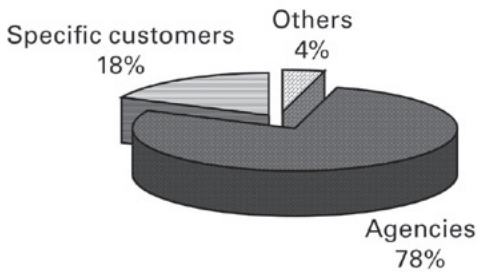


Fig. 1: Accomplishment of immediate delivery percentage by customers
(October 2007 to June 2008)

2.3 3 day delivery

3 day delivery of the DC fans is explained here.

2.3.1 Measures for 3 day delivery

Immediate delivery is performed by maintaining appropriate inventory of the product and production lead time as short as possible by the system. A risk to hold product inventory occurs here. So, we have created a scheme of "3 day delivery" to deliver with minimal lead time from the reception of the production confirmation without carrying product inventory.

2.3.2 Structure of the 3 day delivery

It is necessary to perform in completely different method from standard flow of production and delivery after receiving the production confirmation for the 3 day delivery.

Following is the description of the flow.

1st day, AM : Issue received order (Sales Department action)
1st day, PM : Extraction of subject from received order and production preparation
2nd day : Start of production
3rd day : End of production. Stocked, delivery.

Table 3: 3 day delivery schedule

Operation	In charge	1st day		2nd day		3rd day	
		AM	PM	AM	PM	AM	PM
Issue received order	Sales Department	→					
Extraction of subject from received order	Production Management Department		→				
Generate production order	Production Management Department		→				
Confirm necessary parts / order	Production Management Department		→				
Preparation of parts	Production Department		→				
Start of production	Production Department			→	→	→	
Stock / delivery	Production Management Department					→	→

There is only 2.5 days in factory, leaving no leeway, for 3 day delivery. Therefore, it was operated by consensus base by answering the possibility to the Sales Department at the beginning. However, it is necessary to answer stably to the request since it is the shortest request. So it was decided to handle everything with 3 day delivery from June 2008.

Also, there are many aspects relying on the operation rules for both Sales and factory side, so certain rules were established.

2.3.3 Accomplishment of the 3 day delivery

Accomplishment of the 3 day delivery is as Fig. 2.

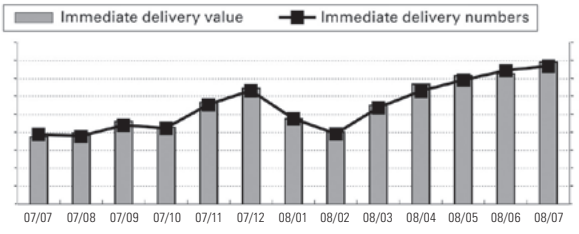


Fig. 2: Accomplishment transition of the 3 day delivery products

It has past approximately 1 year since the 3 day delivery has started, and you can see increase in the counts, numbers, and sales value. This is showing the need for the short time delivery by the customer is there for sure.

2.4 Summary

Needs of the customer is not constant, and it is changing daily. As an assignment for future, periodic reexamination of the target models and safety inventory setting will be necessary.

Also, the 3 day delivery that does not carry any inventory. This was a big challenge, but what made this challenge possible are continuous improvements such as following at the production.

(1) Reduction of production lead time for each process of parts and product assembly
(2) Measures to observe deadline at each process of parts and product assembly
(3) Measure to clarify the role and enhance the cooperation between related departments
(4) Rules of action when a problem occurs, and its enforcement

With these quiet dedications, consciousness and confidence is brewed within each person, generating a climate to challenge the toughest challenges.

3. Measure and accomplishment of maintaining 100% delivery deadline observance

3.1 Setting the delivery deadline observance rate

It is important to comply with short time delivery, such as immediate delivery and 3 day delivery mentioned previously. But, it is also important to deliver necessary quantity on the deadline agreed with the customer.

There are various requirements for the delivery time by the customer for fans. There are customers who ask for immediate delivery, but there are many cases where they have fairly long delivery time. There are times where the delivery dates can be adjusted by the customer by adjusting their production plan. That is, it is important to deliver the product on the promised date without any delay.

** Definition of the delivery deadline observance rate **
Delivery deadline observance rate (%) + (delivery number - late delivery number) / delivery number

3.2 Activities to increase the delivery deadline observance rate

What can be done to observe the promised delivery time for sure? Following are the important points.

(1) Standardization of the production plan and keeping the production activity following the plan
(2) Arrangement of the parts in accordance to demand forecast
(3) Prompt answering of delivery time and appropriate delivery time adjustment
(4) Confirmation activities to observe the delivery time for all received projects

Explain what activities were performed for each point.

3.2.1 Standardization of the production plan and keeping the production activity following the plan

It is possible to standardize the production by extract the production information from the production system and modifying them appropriately.

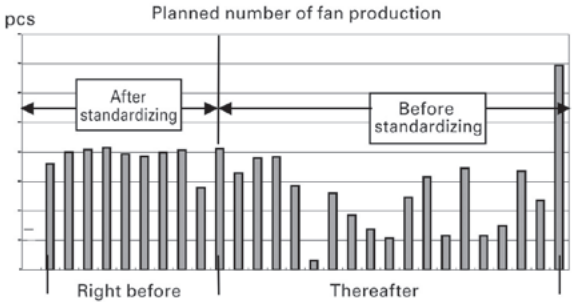


Fig. 3: Load leveling graph to perform production standardizing

3.2.2 Arrangement of the parts in accordance to demand forecast

Parts are supplied by the new demand forecasting tool that is implemented with the change in the system, which will periodically review the forecasting value.

Also, with that data as a base, information is supplied to the concerned parties twice every month as a 3 month production plan.

3.2.3 Prompt answering of delivery time and appropriate delivery time adjustment

It is possible to answer the delivery time in speedy manner if the production plan is standardized and parts are ordered beforehand based on the forecast. Therefore, delivery can be adjusted with customers as soon as the order is received, and the result can be reflected to the production plan.

3.2.4 Confirmation activities to observe the delivery time for all received projects

For all received order, stocking instruction is given for anything that is not in inventory to make the deadline.

Also, production plan is checked daily, not only right before the delivery, to prevent production going late. To be specific, to check which parts are missing at the load balancing of the final assembly process, and confirming the progress and reminding of delivery.

3.3 Summary

Fig. 4 is the transition of the delivery deadline observance rate

It has kept on rising from April 2006, and it is close to 100% currently.

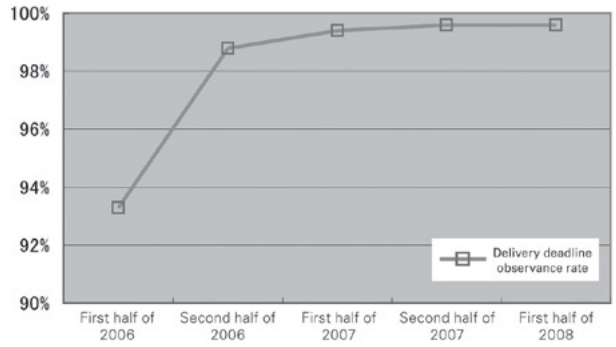


Fig. 4: Transition of the delivery deadline observance rate

4. Measure for short time delivery of the sample products

4.1 Positioning and types of sample products

Provide the products matching the needs of the customer to the market in timely manner. We have searched how we can be the No.1 delivery time in the market for this too.

There are many types of trial products, from newly developed products to minor modification such as change in the termination of the lead lines, making it necessary to answer each customer's request. A measure to shorten the delivery time of product sample has started, so our product will be accepted by delivering a product customer is requiring.

Following is the results of what types of sample products there are by analyzing the request from the customer.

(1) Unprocessed lead wire termination product to connect the connector requested by the customer

(2) Product with sensor to detect the malfunction of the fan or control function to change the fan speed added

(3) Product with specification such as fans rotation speed changed

(4) Newly developed product to completely modify the basic function of the fan

Comprehension of status for each of these cases were made, and investigated the problematic points to shorten the delivery time.

4.2 Minor modification product

4.2.1 What is minor modification product

Minor modification product is a product to change the specification of the mass produced product to match the requested specification from the customer, and it is the sample product (1) to (3) that was mentioned previously.

These samples are based on the products that are mass produced already, so it is possible to create the sample without creating the machines or molds.

4.2.2 Measure to shorten the delivery time for minor modification product

We have repeated review on the production method for variety of modification product, and taken out waste from the ordering of the parts, lead time, and production method.

For the unprocessed lead wire termination product, improvement was made by applying the short delivery time system previously mentioned (see Section 2) to the base product parts. As for the connector which is a special parts, operation was done by investigating the connector specification that had many request from the customer, and create a list of acquisition source of the parts and in-house inventory.

As for the product with control function added, we have asked cooperation with the circuit board manufacturer, so the delivery date of the printed circuit board will be set at the point when the designing is completed, making the schedule of the latter procedures clear, and then went to secure all the necessary parts.

As for the product with specification changes, such as fans speed, it was able to meet by changing the specification of the coil that determines the rotation speed, so the short delivery time was realized by installing dedicated machines for trial production.

Problems such as wasted time by operation of the in-house ordering, problem of lead time of the circuit board manufacturer, and time to transport the parts were extracted by the reviews performed to shorten the delivery time for the samples of the minor modification product.

By improving the methods that was thought to be best previously, it has led to shorter delivery time by eliminating the waste.

4.2.3 Accomplishment

With above mentioned measures, delivery time of the minor modification sample products has decreased 25% from the conventional production method.

4.3 Newly developed products

4.3.1 What is newly developed product

Newly developed product is a product that was modified from the basic designing, where all the parts need to be newly developed, so machines and mold need to be generated to create the sample.

4.3.2 Problems

It takes longer time to produce newly developed sample product since the machine and molds need to be created. Therefore, a measure to improve the sample production lead time for newly developed product was started.

4.3.3 Measures to short delivery time of newly developed product

Biggest challenge of short delivery time of the newly developed product is the lead time to create molds for new parts. We are

creating all molds for mass production in-house. Conventionally, we were using these mass production molds to produce sample products. Therefore, sample production had to wait until the mass production mold was completed.

Simplified mold was adopted to shorten the delivery time for the newly developed product. Simplified mold was generated by limiting the guaranteed shot count, instead of mass production types, which needed to consider to be longer operating life. Review of the mold structure and mold material to be compatible for short delivery period was made. As for the mold material, a material with ease of processing was selected, and the processing method was improved to shorten the processing time. As for the mold structure, parts were made common, so the time to order the parts and time for designing was reduced.

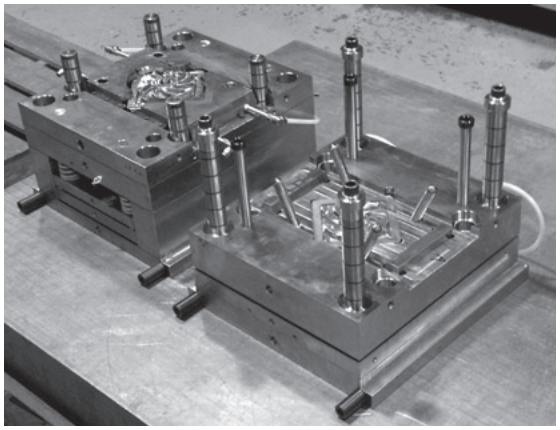


Fig. 5: Simplified mold

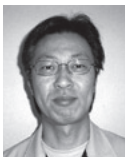
4.3.4 Accomplishment

With all the above improvements, lead time for mold generation has decreased to half. As a result, delivery time of the sample of the newly developed product has decreased drastically.

5. Conclusion

The measures for “becoming #1 delivery time in the industry" was explained. The biggest reason this measure was accomplished was change in the consciousness. Everyone in the Cooling System Department is now constantly thinking how to fulfill the request from the customer. As a result, measures such as immediate delivery, 3 day delivery, and short delivery time of the sample product were achieved.

Measure to have #1 delivery time in industry will continue to earn more customer satisfaction.



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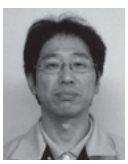

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