

Chapter 6

Improve maintenance system

As you can see, in the beginning the company loss much opportunity in production. The one major cause of loss opportunity in production is machine breakdown. And one cause of machine breakdown is poor in maintenance system. If the maintenance system is improved it will reduce the number of machine breakdown or in other hand it will reduce the waste time in maintenance. When the waste time in maintenance is reduced it will reduce loss opportunity in production. From chapter 3 the problem of weak in maintenance system is defined in to three major points; (a) Maintenance document, (b) Maintenance management, (c) Technician. The first point that this chapter will improve is maintenance document.

6.1 Maintenance document

The maintenance section is very weak and poor in document system. It's because the section has only one document. It is daily report of maintenance technician. There are many documents that the section should have such as; Job request, Work order, Job description, Machine inspection card, Maintenance report, Machine maintenance record and etc.

Work order & Job request system

The first document that this thesis will implement is job request form. The Job request form is very importance. It is the only one memo for the requester to maintenance section. It is not only shows the name of requester but also show many detail such as:

- machine number
- time of breakdown
- course or type of error

There are so many styles of the lay out. In order to set up the proper lay out it depends on the nature of each workplace. And the form should be easy to read and fill out.

Work order is one of the most important documents. It is the memo from the head of maintenance section to the technician. And it shows the details of the breakdown machine and recommend or order of the head of maintenance section it is very useful to the technician. The technician will not forget to fix the machine or he will know which machine should go first and what part of the machine that he should fix. It should include some important detail such as:

- type and number of machine
- symptom of damage
- name of repairer
- name of requester
- the part that has been used
- Time in repairing and etc.

As you can see the “Work order” and “Job request” form are very important and they can be put together. The new form or we can call the work order form should be separated into three parts. The first part is job request part this part is used for the requester to fill in the detail of the breakdown machine. The second part is work order. This part is issued by the head of maintenance section. He will select the proper technician and set up the priority of the breakdown machine that he has to go to fix. The last one is record form. In this part it includes many details such as name of receiver, list of repairing part, detail of changing part, corrective action, time during repairing, and etc. This part is used by the maintenance technician. The maintenance technician will fill in every important detail that he did in this part.

The head of maintenance section will assign one work order form for one machine breakdown. If the technician has to fix many machines in one his working day he will receive many work order bills from the head of section. In the same way if the requester has many jobs to request he or she will write many job orders in work order form equal to number of machine breakdown too. In this situation the suitable form is shown in figure 6.1

ABC Company	
Job Request	
Machine No. <u>B16</u> Breakdown Date <u>15 / 7 / 2002</u> time <u>8.30 AM</u>	
Course /type of breakdown <u>Cutter not work</u>	
Requester <u>Saifon</u> Status <input type="radio"/> urgent, <input checked="" type="radio"/> can wait <u>4</u> hr.	
Work Order	
To <u>Tavee</u> Repairing Date <u>15 / 7 / 2002</u> time <u>8.30 AM</u>	
Condition in repairing <u>stop the moving part, open air valve and main power</u>	
Scope of job <u>Inspect the air cylander and relay control No. 32</u>	
Approve by <u>Tirdsak</u> Position <u>Chief of section</u>	
Technician report	
Symptom of damage <u>air cylander move slow the air seal lose</u>	
List of repair item _____	
List of change parts <u>1. Air seal</u>	
Comment _____	
Repair by <u>Tavee</u> Start time <u>9.00 AM</u> Finish time <u>9.45 AM</u>	
Inspect by <u>Parsong</u>	Time during repair (min.)
Comment _____	<u>45 min</u>

Figure 6.1: Form of Maintenance Data

Maintenance report & Machine maintenance record

From chapter 3, the factory has many machine maintenance records. It records in each technician dairy report book. Report by this way is easy to monitor the technician but difficult to search of the history of each machine. It's because the data is not filing in to each machine record book. The way to solve this problem is record each daily report of each technician to the maintenance machine book. From topic "Work order & Job request system" at above the work order form can be used as a maintenance machine record book. By filing the work order in to each file of the machine. The machine will have it own machine history. In order too easy for search the data. The work order form should be separated in to difference units and each unit should arrange the date as show in figure 6.2.

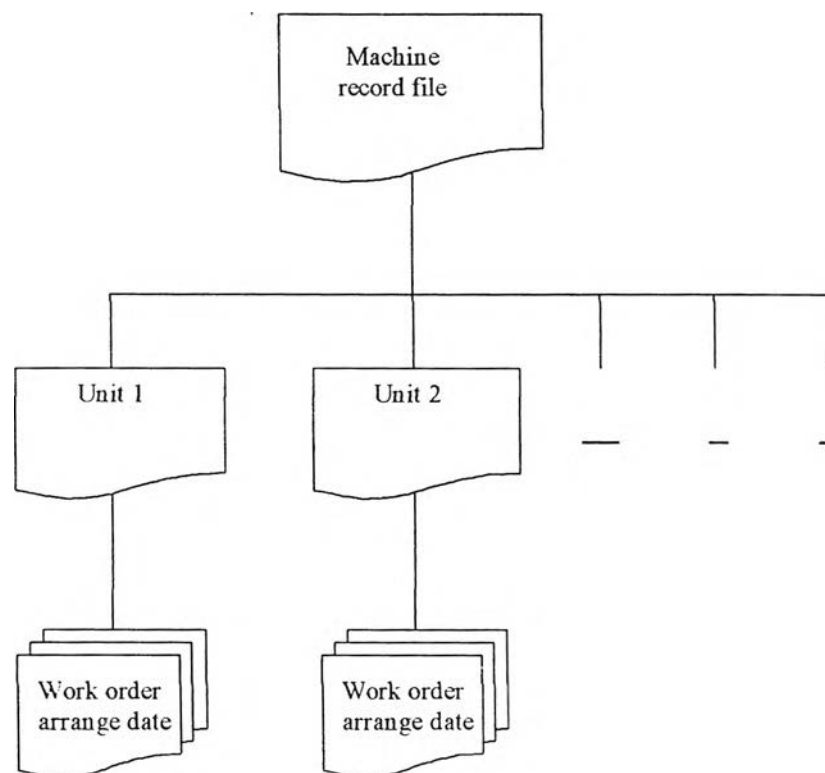


Figure 6.2: concept of filing the maintenance machine record

By this concept it is easier to search the data of maintenance in each machine. The searcher will know every thing such as who is requester, who fix the machine, when the machine breakdown, what is the cause of breakdown, what is corrective action, what type of changing part, how long does it take in fixing, and etc. It can be a guide in order to prepare the spare parts before remove it. It is a good source to calculate the working life of each changing part. This record can use the data to set better maintenance schedule in the future.

The form of maintenance data is keeping in maintenance section. When the machine breakdown is occurred the machine user will withdraw the form and write the job request part. The requester will send it back to maintenance section. The chief of maintenance section or the head of engineering department will select the staff and write the detail in work order part and record in the maintenance data control card. The technician will receive the maintenance data and go to work follow the detail in work order part. After he finishes fixing the machine he will fill the form in technician report part. When the machine is finish fixing the inspector will inspect and comment. The form will send it back to the maintenance section when the technicians finish his working day. The chief of maintenance section will check it with the maintenance data control card and keep it in the maintenance machine record file. If the form is not come back it mean that the job can not be done or the technician forget to return the form. The chief will follow in next day. The flow of maintenance data is show in figure 6.3

The maintenance data form control card is used in order to control the number of return form in one working day. The form is withdrawn by the requester and goes to the chief of maintenance section and pass too technician. If the form is not come the job that record in the card will not equal to the number of the return form. The chief will know that what form is missing, what job has not been done, and who take respond. The control card is showing in figure 6.4.

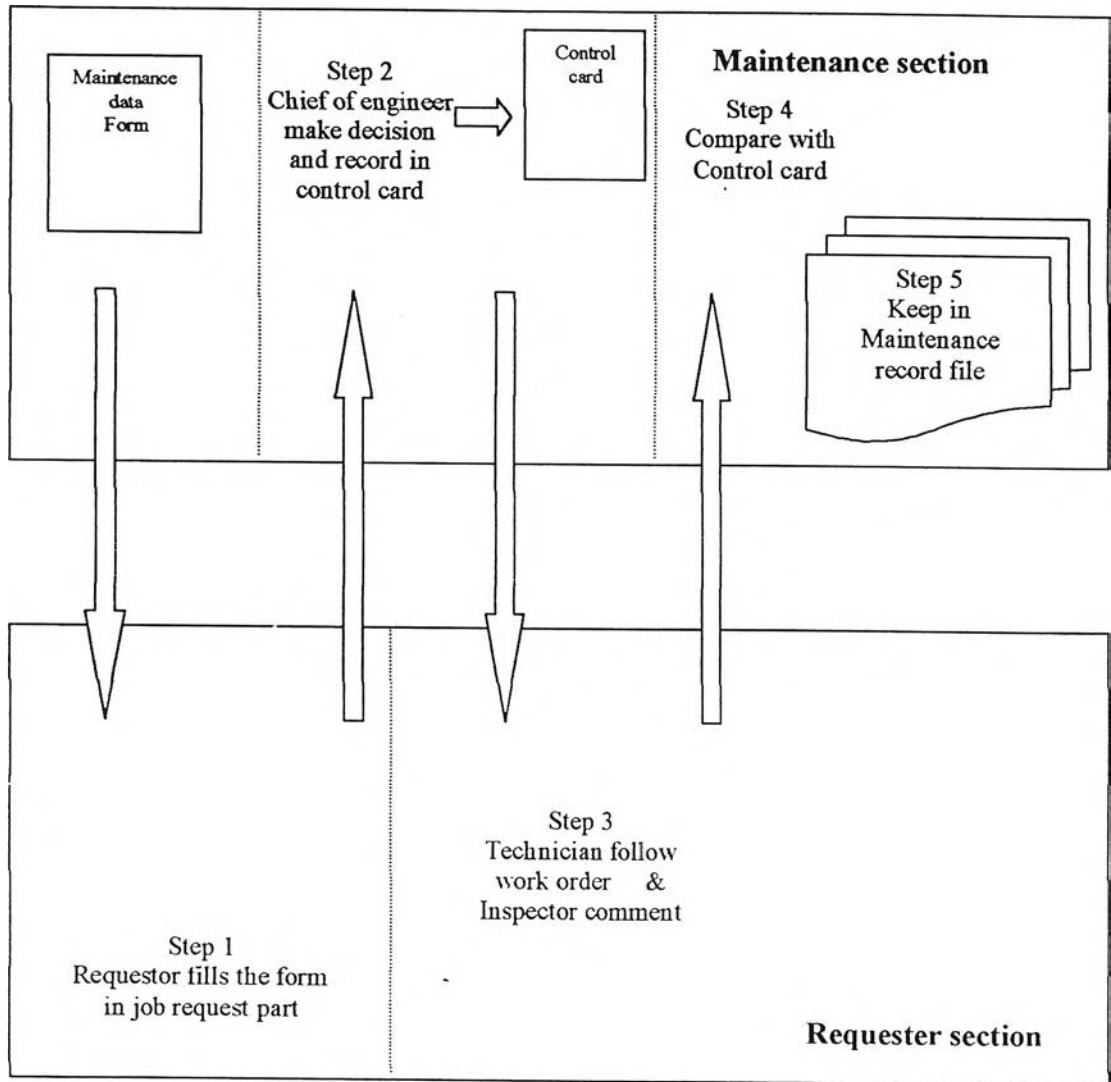


Figure 6.3: flow of maintenance data form

Machine inspection card

The machine inspection card is used to inspect the parts of the machine in order to found the weakness part before it breaks down. It helps inspector not forget to inspect every part in the list.

ABC Company			
Inspection Weekly Report of blow molding machine			
Date... 30/06/2002. Name... Chainalong... <input type="checkbox"/> = good condition X = require repair			
Detail of the part	Activity	Result	Comment
1. Carriage			
1.1 Hydraulic cylinder	IP	<input type="checkbox"/>	dirty
b) DAS 50.40/1	IP	<input type="checkbox"/>	
2. Clamping			
2.1 Hydraulic cylinder	IP	<input type="checkbox"/>	
a) DAS 40.30/1	IP	<input type="checkbox"/>	
3. Blow pin			
3.1 Hydraulic cylinder	IP	<input type="checkbox"/>	
d) DAS 40.30/1	Ip	<input type="checkbox"/>	
4. Hydraulic flow tube system			
5. Hydraulic pump	Ip	<input type="checkbox"/>	
8. Cuter			
8.2 Proximity switch	Ip	<input type="checkbox"/>	dirty
8.3 Stainless knife	Ip	<input type="checkbox"/>	
12. Drive coupling	Ip	<input type="checkbox"/>	
13. Main motor (Bearing)	Ip	<input type="checkbox"/>	
14. screw gear box	Ip	<input type="checkbox"/>	
Remark:.....			

Figure 6.5: Current inspection weekly report of blow molding machine

ABC Company

Inspection Monthly Report of blow molding machine

Date...1/07/2002. Name...Chainalong ☐ = good condition X = require repair

Detail of the part	Activity	Result	Comment
1. Carriage			
f) relay	Ip	☐	
g) solenoid valve	Ip	☐	
2. Clamping			
e) relay	Ip	☐	
f) solenoid valve	Ip	☐	
3. Blow pin			
e) relay	Ip	☐	
f) solenoid valve	Ip	☐	
4. Hydraulic flow tube system			
4.1 Clamp (Hydraulic tube 3/8")	Ip	☐	
4.2 Carriage (Hydraulic tube 3/8")	Ip	☐	
6. Heater & Die head			
6.3 Relay	Ip	☐	noisy
8. Cuter			
8.4 Relay control	Ip	☐	
10. Oil cooler system	Ip	☐	

Remark:.....

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Figure 6.6: Current inspection monthly report of blow molding machine

6.2 Improve in maintenance management

The old organize is not suitable for the scale of the section. It was used since 1990. At that time the company had about twenty units of machine. The Head of engineering department has been working since 1987 until now. Nowadays the company has more than eighty machines. And the head of department has his jobs to take a respond all of the machines and support system. Head of engineering department not only takes care of engineer section but also take care machine setting section too. By the old organize it seem to be over load for the head of department. Figure 6.7. The new organize chart of engineering scopes in only maintenance section. The objective of the new organize is to rink the relationship of the boss and technicians. It can reduce work of the boss that the boss may have more time to develop the department and monitor the technicians. It must be good affect to the company.

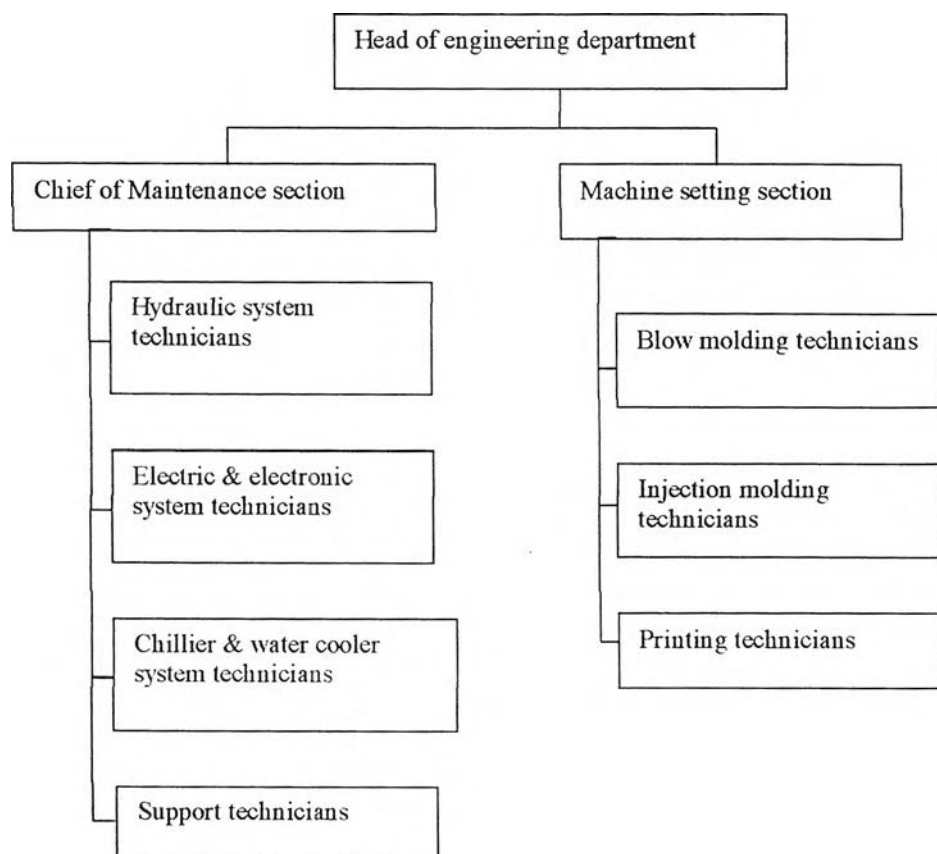


Figure 6.7: new organize chart of the engineering department

The new organize develop in:

1. Separate technician in job of skill
2. Include chief of maintenance section position; Chief of Maintenance section has to take respond in manipulates job to each technician, control and inspects every job. And report problems and events to head of engineering department. The chief should good in English because the head of engineering department can not read and write Thai.

After study the problem, the new flow chart in step of working has been change. By the time, the machine breakdown production report to Chief of Maintenance. Chief of Maintenance analyze the problem or cause of breakdown and he have to fix it. After that Chief of Maintenance will sand the high shill in that case to fix the machine. If the staff is not free he will arrange urgent case of the job and set schedule or report to the boss to make a decision in order to out source service. The flow chart in step of working is showing in figure 6.8.

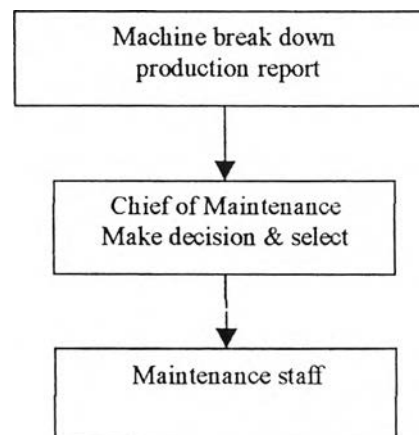


Figure 6.8: new flow chart in step of working

6.3 Improve Technician

Work hard staff

There are only five staffs in maintenance section. It is not enough for the large scale of the company. The section needs more staff in order to share the job and reduce working hour. The numbers of six staffs are proper to the scale of the company and working hour should not exceed over ten hours per day or the section consider the increasing the number of the staff from five to six staffs.

Low education

The maintenance technicians are not high educated some staff graduates only primary school. So standard of the new maintenance technicians should graduate at least college school. The technician that has high education is better in the studies of new knowledge. The trainer has not spent much time in teaching. And he can adapt his knowledge to his job. The new technicians that the section considers to admit should have at least diploma degree.

High turn over

As you can see in chapter 3, the maintenance technician turnover rate is very high it about thirty percent per year. It affects to the quality of maintenance section very much. The trainer has to train the staff again and again. It takes a lot of time and money. There are many causes of loss the technician such as rate of salary, conflict with supervisor or other staff, young staff and etc.

The section has to compare the late of salary between our company and nearly all companies. The rate of salary should be equal or similar to other. The comparison should be at least every year.

The staffs in section should have some activity in each month such as unofficial meeting or unofficial problem discussion with the chief of section or the head of engineering department. The head of department and the chief of section should have more relationship with the staffs. It can reduce the conflict between each other.

The maintenance staff should have private room or place of the section in order to do some jobs or take a rest during break and it easy to search the free staff or leave the message to the particular staff. It will increase good relationship between staffs.

Job description

The job description is very importance it identifies the duty and responsibility of each position. It makes clear cut in the job of each staff. The sample of job description is showing in figure 6.9.

Lack of training

The technicians have lack of training because the section has no chief of section and the head of department is not free to train them. When the section has chief of section the head of department will has more time to train the staffs. And the chief of section can help the head of department to train the staffs.

Position: Chief of section	Section: Maintenance
Department: Engineering	
Job description	
<ol style="list-style-type: none"> 1. Take care of all maintenance and repair machines. 2. Take care of all staff. 3. Guide and give recommendations to every section when they request. 4. Monitor and encourage all staffs 5. Assign work order to each staff 6. Train new and present staffs 	
Authority: promote and punish staff	
Immediate Supervisor: head of engineering department	
Subordinates: maintenance technician	
Qualification: bachelor degree of engineering	

Figure 6.9: Job description of chief of maintenance section

Position: Hydraulic Technician	Section: Maintenance
Department: Engineering	
Job description	
<ol style="list-style-type: none"> 1. Repair all hydraulic system of the machines. 2. Follow the order of Immediate Supervisor 3. Guide and give recommendations about hydraulic system to every section when they request. 4. Report the detail of the job in maintenance data form. 5. Joy with new and present staffs. 	
Authority: work every request section	
Immediate Supervisor: chief of maintenance section	
Subordinates: -	
Qualification: diploma degree of maintenance	

Figure 6.10: Job description of hydraulic system technician of maintenance section.

Position: Electric Technician	Section: Maintenance
Department: Engineering	
Job description	
<ol style="list-style-type: none"> 1. Repair all electric system of the machines and supports system. 2. Follow the order of Immediate Supervisor 3. Guide and give recommendations about electric system to every section when they request. 4. Report the detail of the job in maintenance data form. 5. Joy with new and present staffs. 	
Authority: work every request section	
Immediate Supervisor: chief of maintenance section	
Subordinates: -	
Qualification: diploma in electric technician	

Figure 6.11: Job description of electric system technician of maintenance section.

Position: Pneumatic Technician	Section: Maintenance
Department: Engineering	
Job description	
<ol style="list-style-type: none"> 1. Repair all pneumatic system of the machines and supports system. 2. Follow the order of Immediate Supervisor 3. Guide and give recommendations about pneumatic system to every section when they request. 4. Report the detail of the job in maintenance data form. 5. Joy with new and present staffs. 	
Authority: work every request section	
Immediate Supervisor: chief of maintenance section	
Subordinates: -	
Qualification: diploma degree of maintenance	

Figure 6.12: Job description of pneumatic system technician of maintenance section.

Position: General staff	Section: Maintenance
Department: Engineering	
Job description	
<ol style="list-style-type: none"> 1. Inspect the machines follow the inspection plan, clean the machine follow the maintenance plan and help other technician 2. Follow the order of Immediate Supervisor 3. Guide and give recommendations about cleaning and inspection system to every section when they request. 4. Report the detail of the job in maintenance data form. 5. Joy with new and present staffs. 	
Authority: work every request section	
Immediate Supervisor: chief of maintenance section	
Subordinates: -	
Qualification: high school	

Figure 6.13: Job description of General staff of maintenance section.



Position: Cleaning staff	Section: Maintenance
Department: Engineering	
Job description	
<ol style="list-style-type: none"> 1. Clean the area by follow the area and time of cleaning plan 2. Follow the order of Immediate Supervisor 3. Warn the person who make the plant dirty 	
Authority: work every place follow the area and time of cleaning plan	
Immediate Supervisor: chief of maintenance section	
Subordinates: -	
Qualification: primary school	

Figure 6.14: Job description of cleaning staff of maintenance section.