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ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

DESIGN OF A CUSTOMER COMPLAINT MANAGEMENT SYSTEM:
A CASE STUDY OF STEEL MANUFACTURING



Mr Dechakom Boonma

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

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วิทยานิพนธ์นี้ได้ทำการศึกษา การออกแบบการจัดการข้อร้องเรียนจากลูกค้า ของบริษัทแห่งหนึ่งซึ่งทำการผลิตเหล็กแผ่นรีดเย็น เพื่อลดระยะเวลาการดำเนินการข้อร้องเรียน โดยเริ่มตั้งแต่กระบวนการตรวจสอบข้อร้องเรียนของลูกค้าที่เกิดจากผลิตภัณฑ์ที่ไม่ตรงตามคุณภาพ การวิเคราะห์สาเหตุและการแก้ปัญหาเพื่อป้องกันการเกิดซ้ำของผลิตภัณฑ์ที่ไม่ตรงตามคุณภาพ รวมถึงการออกแบบฐานข้อมูลเพื่อช่วยในการวิเคราะห์และป้องกันการเกิดซ้ำของผลิตภัณฑ์ที่ไม่ตรงตามคุณภาพ

ผู้เขียนได้นำการวิเคราะห์แผนภูมิแสดงเหตุและผล (Cause and effect diagram) มาใช้เพื่อวิเคราะห์ระบบการจัดการข้อร้องเรียนของลูกค้า และระบุประเด็นหลักโดยอาศัยการวิเคราะห์แบบพารето (Pareto) และการใช้แนวคิดในการกำจัดของเสีย (3M, Muri, Mura, Muda) เพื่อการออกแบบระบบการจัดการข้อร้องเรียนโดยรวม

เมื่อทำการเปรียบเทียบก่อนและหลังการใช้ระบบการจัดการข้อร้องเรียนที่ถูกออกแบบขึ้น ผลการเปรียบเทียบแสดงให้เห็นว่า เกิดผลตามวัตถุประสงค์อย่างมีนัยสำคัญ กล่าวคือ ลดระยะเวลาโดยเฉลี่ยของการดำเนินการข้อร้องเรียนจากลูกค้าลง 39.7 วัน จาก 69.3 วัน หรือ 56.9% นอกจากนี้ยังเกิดผลพลอยได้จากการลดค่าใช้จ่ายในการชดเชยผลิตภัณฑ์ที่ไม่ตรงตามคุณภาพ ลง 3.6 ล้านบาท หรือ 63.46 % ในช่วงระยะเวลาที่ทำการศึกษา

ข้อสังเกตจากการวิจัยครั้งนี้คือ ระบบการจัดการข้อร้องเรียนดังกล่าวยังสามารถนำไปประยุกต์ใช้ได้อีกหลายหน่วยงานในอนาคต

ศูนย์ระดับภูมิภาคทางวิศวกรรมการผลิต

สาขาวิชาการจัดการทางวิศวกรรม

ปีการศึกษา 2545

ลายมือชื่อนิสิต.....

ลายมือชื่ออาจารย์ที่ปรึกษา.....

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

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KEY WORD: COMPLAINT MANAGEMENT SYSTEM/ CAUSE AND EFFECT DIAGRAM / PARETO / DATABASE SYSTEM

DECHAKOM BOONMA : THESIS TITLE. DESIGN OF A CUSTOMER COMPLAINT MANAGEMENT SYSTEM : A CASE STUDY OF STEEL MANUFACTURING. THESIS ADVISOR : ASSISTANT PROFESSOR PRASERT AKKHARAPRATHOMPHONG, THESIS CO-ADVISOR : SAKDA ASSAWAPONGPULLKIT, 141 pp. ISBN 974-17-1106-9

This research is to study the complaint management system of a steel manufacturing company in order to reduce the process time of overall complaint system. This research includes the complaint investigation process, the corrective action and preventive action process. Finally the recurrence defects corrective action and preventive action database is implemented in order to handle the recurrence defects.

The writer has used the Cause and effect diagram to analyse the potential problem. The Pareto analysis is also used to identify the priority of problems. Finally the 3M (Muri, Mura, Muda) technique is used to eliminate the waste in the system.

After the implementation, the process time of the complaint management system is compared to the prior study period. The company has reduced the process time of 39.7 days from originally 69.3 days, or 56.9%. In additional, it also results in the reduction of financial claim for the defective products of 3.6 million baht, or 63.46% during the study period compared to the 5.67 million baht claims of the previous year.

The observation on this research is that the idea of designing complaint management system can be adapted and implemented into other function for further rigorous benefits.

Department The Regional Centre for

Manufacturing Systems Engineering

Field of study Engineering Management

Academic Year 2002

Student's signature.....

Advisor's signature.....

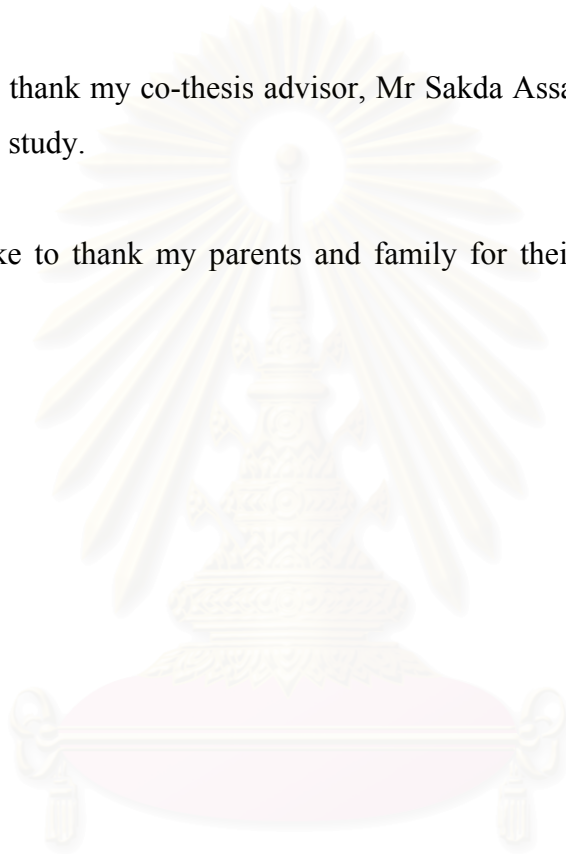
Co-advisor's signature.....

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I also would like to thank my co-thesis advisor, Mr Sakda Assawapongpullkit for his guidance during the study.

Finally, I would like to thank my parents and family for their endless support and encouragement.



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CHAPTER 1

INTRODUCTION

This chapter involves the introduction of the research and the rationale behind the decision to conduct the research. The objectives and the scope are discussed in this chapter.

1.1 Background of the research

The competition among businesses in Thailand is becoming stressful due to the business downturn. The steel businesses are also affected by the economy recession due to overall domestic over capacity. This particular situation increases the power of buyers and decreases the power of suppliers. As a result, apart from lowering product's price the companies have to improve their products and services quality in order to create their competitiveness.

Customer complaint is one of the issues that affect the customer satisfaction. It is caused by non-conforming products and services. The most important thing once the customer complaints exist is how to solve the sudden problem for customers and prevent them from recurrence. In order to solve the problems, company needs to understand the problem based on the data collected, then analyse the data and determine the causes and solution of the problem.

The way to collect and process the data can be enhanced by using the information system. Using of information system on database management helps improve the efficiency of common process such as order processing, product deliver scheduling etc.

1.2 Statement of Problem

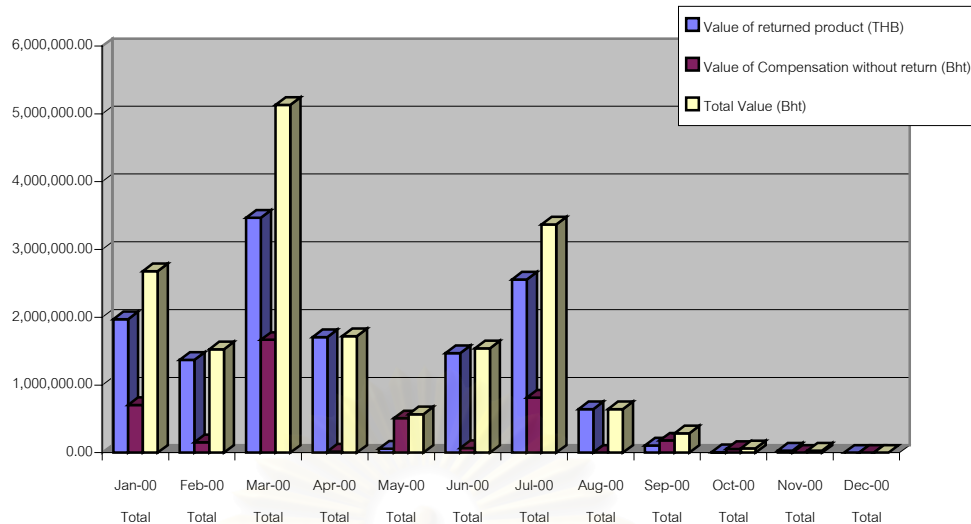
The steel manufacturing company is dealing with numbers of customer complaints per year.

The previous data during year 2000 is shown in Table 1.1

Table 1.1 Summary of complaint in year 2000

Input Date	T o n n e involved	Weight f o r r e t u r n (MT)	Weight for Compensation (MT)	T o t a l Weight Rejected (MT)	Value for return (THB)	Value for Compensation (Bht)	Total Paid Value (Bht)	Number o f complain t
Jan-00	292.538	85.14	101.628	186.77	1,972,892.44	705,782.59	2,678,675.03	26
Total								
Feb-00	114.175	47.498	21.426	68.92	1,372,369.10	155,302.75	1,527,671.85	17
Total								
Mar-00	226.263	116.048	79.724	195.77	3,468,199.66	1,666,888.02	5,135,087.68	25
Total								
Apr-00	158.181	49.598	9.122	58.72	1,706,113.97	15,647.86	1,721,761.83	18
Total								
May-00	243.157	2.407	155.167	157.57	59,452.90	510,257.00	569,709.90	19
Total								
Jun-00	227.4782	42.677	38.227	80.90	1,470,495.71	69,391.52	1,539,887.23	18
Total								
Jul-00	1033.458	118.846	704.172	823.02	2,555,773.78	812,975.00	3,368,748.78	21
Total								
Aug-00	376.639	28.214	0	28.21	646,173.32	0.00	646,173.32	25
Total								
Sep-00	716.641	2.918	0.586	3.50	106,216.00	179,688.56	285,904.56	16
Total								
Oct-00	87.86	0.233	6.236	6.47	6,826.90	55,770.50	62,597.40	11
Total								
Nov-00	582.99	1.426	0	1.43	29,546.72	0.00	29,546.72	33
Total								
Dec-00	596.994	0	0	0.00	0.00	0.00	0.00	18
Total								
Grand Total	4656.3742	495.005	1116.288	1,611.29	13,394,060.50	4,171,703.80	17,565,764.30	247

- Tons of product involved = Weight of defective products customer intended to claim
- Total weight of actual rejected = Weight of defective products that company accept as its liable and agree to pay for customer
- Weight of product returned = The amount of returned product after company accept claim
- Weight of compensation without return = The amount of product where commercial agreement, such as discount, is settled without returning goods.



- Value of returned product = value of returned product due to accepting claim (Thai Baht)
- Value of compensation without return = value of commercial settlement due to accepting claim without return product (Thai Baht)
- Total value = sum of Value of returned product and Value of compensation without return

Figure 1.1 The summary of complaint in Tons and Thai baht

The summary of complaint clearly shows that most complaints recorded are at least three months before. This is because of complaint currently existing always spend long time to finish. This would cause dissatisfaction of customers when they have to wait long for problem solving. Sometimes data of complaint are missing and complaint cannot be finalised. The summary of defect is not shown correctly which prevent the engineers and management from clearly understand the problem in manufacturing process.

The summary of the problems can be listed as following;

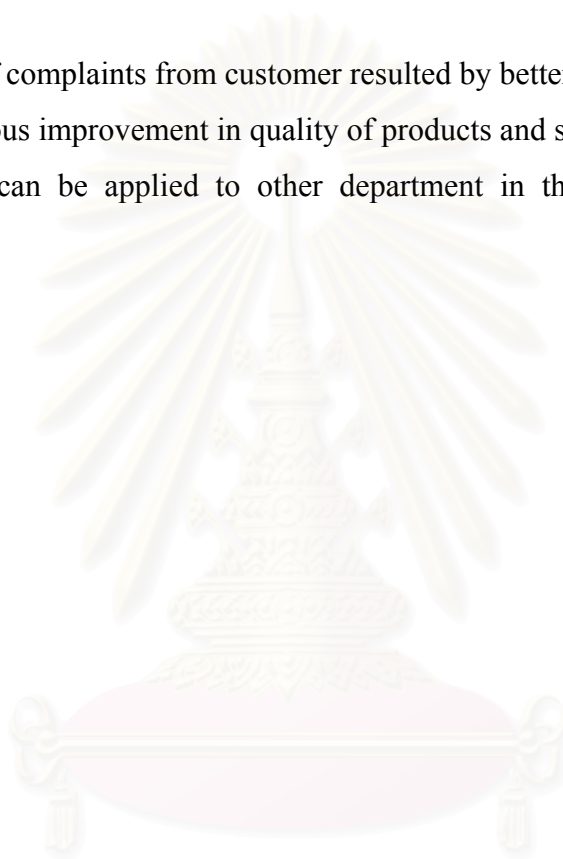
1. Complaint spends long time to finish which cause customer dissatisfied.
2. Data of complaint is sometime missing which leads to unfinished complaint and improper decision making for solving problem.
3. Lack of data provided for understanding the situation of non-conforming process.
4. No update technical data provided for manufacturing team to prevent potential problem.
5. No updated financial loss due to complaint.

data after implementation									
7. Prepared report and presentation for Thesis									
8. Final examination									

1.6 Expected result

Apart from the objectives, the following benefits are also expected from this study:

1. Reduction of complaints from customer resulted by better quality of products.
2. The continuous improvement in quality of products and services in this business.
3. Its concept can be applied to other department in the company and to other businesses.



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CHAPTER 2

THEORETICAL CONSIDERATION

In proposing the sound complaint management system, there are several theories related and contribute to the development of the process. These include the definition of quality and complaint, the quality management system and ISO 9000, the Complaint handling according to Australian standard AS 4269-1995. The details are as follows.

2.1 Definition of Quality

The word “quality” is used frequently in our life. People define quality in different ways. Some are defining quality as goodness, or luxury, or shininess or weight. There is also the advertisement quoting the phrase such as “quality of life” which becomes more familiar day by day even though it does not define anything by itself but leaving the listeners imagine of their own dream. The proper definitions of quality are conformance to requirements (Crosby, 1979) or fitness to purposes (Juran and Gryna, 1993). There also be other definition according to Australian Standard AS 4269 – 1995, the quality is the totality of features and characteristics of a product or service that bears on its ability to satisfy stated or implied need.

In order to understand Quality, there are many erroneous assumptions held by many people. According to Crosby (1979), there are five erroneous assumptions of quality always held by most management individuals.

First is the meaning of quality, as discussed above, the proper meaning of quality is the conformance to requirements. Without defining the requirements, people would still imagine in their own dream. Once the requirements are defined, then the conformance to the requirement can be made.

The second erroneous assumption held by people is the quality is intangible. It is measurable and it is called the cost of quality which is the expense for the nonconformance. It includes the prevention, appraisal and failure categories. The measurement should be established and displayed in order to provide visible proof of improvement and recognition of achievement.

The third erroneous assumption is that there is the economic of quality. Actually there is no excuse for not doing anything right at the first time since it is always cheaper to do it right the first time.

The fourth erroneous assumption is the problems are mostly caused by the operators. In fact most of the problems are caused by higher level manager rather than lower operators.

The fifth erroneous assumption is that quality originates in quality department. The quality, in fact, must be originated by each individual person. The quality people cannot perform the task instead of its owner, but quality people can drive to develop the positive attitude toward quality improvement which includes reporting the clear results of conformance measurement.

2.2 ISO 9001: Quality Management Systems - Requirements

ISO (the international Organization for standardization) is a worldwide federation of national standards bodies. There are ISO technical committees carry out the preparing of international standard. The international standards ISO 9001, quality management systems – Requirements were prepared by the technical committee ISO/TC 176.

The standards released are:

ISO 9000:2000 Quality Management Systems — Fundamentals and Vocabulary

ISO 9001:2000 Quality Management Systems — Requirements

ISO 9004:2000 Quality Management Systems — Guidance for Performance Improvement

ISO 9001:2000 is the actual specification for the quality management system. Its requirements define the criteria for the quality system audit. The role of this standard in the series has not changed, but its content and sectional organization is completely revised. Quality system requirements are now organised into four sections:

Section 5 — Management Responsibility

Section 6 — Resource Management

Section 7 — Product and/or Service Realization

Section 8 — Measurement, Analysis and Improvement

This new organization makes ISO 9001 more compatible with the ISO 14001 (environmental) standard, and is consistent with ISO 9004's Plan-Do-Check-Act improvement cycle. It also corrects the undue emphasis on the manufacturing industries that characterized previous editions.

2.2.1 Continuous improvement

The ISO 9001 was designed to support and enhance the quality improvement, one of the major areas is the continuous improvement. As referred to the quality management system, the continuous improvement lies in the methodology known as “Plan-Do-Check-Act” (PDCA). The PDCA is described in ISO 9001 as follows

Plan – Establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organization’s policies.

Do – implement the processes.

Check – Monitor and measure processes and product against policies, objectives and requirements for the product and report the results.

Act – take actions to continually improve process performance.

2.3 Corrective Action

As quoted by Crosby(1979), the real strength and value of quality engineering involves learning from the past to make a smoother future. The most nonconformance problems are preventable. The prepare the prevention of problems, the best source of information about situations requiring corrective action are observation of actual rejections and analysis of trends.

2.4 Quality and Market share

The quality has become a crucial factor in the business. The Gallup survey of executives of Fortune 500 and other companies sponsored by American Society for Quality Control (ASQC) indicates that forty one percent of them ranked product and service quality as the most critical issue in the near future (Melan, 1993).

A study by Buzzell and Wiersema (Melan, 1993) also showed that gains of four percentage points were achieved when product quality was improved. This is not a significant amount but supporting the idea that quality influences the supply-demand relationship by more than cost alone.

2.5 Definition of complaints

According to Australian Standard AS 4269-1995, the definition of complaint is defined as any expression of dissatisfaction with a product or service offered or provided.

2.6 Level of satisfaction to retain present customer

The acceptable level of customer satisfaction with the product results in a significant loss of new sales. According to Bultmann & Scanlan (Juran & Gryna, 1993), the following table shows the customer satisfaction related to sales

Table 2.1 Satisfaction and Sales

Customer View of Quality	Who will recommend supplier, %	Very willing to repurchase, %
Excellent	96	92
Good	76	63
Fair	35	18
Poor	3	0

Source: Juran and Gryna (1993)

The customer satisfaction on the handling their complaints also affects to the retaining of present customer. Complaints which are resolved with the less-than-complete satisfaction will result in significant lost sales. The following table shows the brand loyalty of customer related to the level of satisfaction from complaint handling

Table 2.2 Brand loyalty

	Completely satisfied complaint	Response acceptable	Dissatisfied complaint
Financial service	73	45	17
Automotive service	71	54	22
	Complaint satisfactorily resolved, %	Complaint unsatisfactorily resolved, %	
Large durable good	80	40	

Source: Juran and Gryna (1993)

2.7 Processing and resolution of customer complaints

The number of complaints in the organization requires the systematic approach. Without the proper management in the system, there would be problems with customer relations. Each quality complaint poses different problems requiring different program of actions as follow:

- Satisfying the complainant. This program is oriented to the complainant and is required for every individual complaint. This involves the prompt restoration of service, adequate claim adjustment, and restoration of goodwill.
- Preventing a recurrence of isolated complaints. It is common practice to bring the complaint to the attention of those who are suspected of having caused them and to ask them what they plan to do to prevent recurrence.
- Identifying the serious complaints which demand detail study.
- Detail analysis to discover the root cause of complaint.
- Further analysis to discover and apply the corrective action to root cause in order to prevent the risk of recurrence.

According to Juran and Gryna (1993), the corrective action group is proposed since the analysis of all complaints program involves interdepartmental functions. The group meets regularly to review all complaints and to review progress on current problems. The minutes of meetings, including a problem-status log, are formally recorded, and actions to be taken are documented and distributed to all concerns. The process of handling customer complaints has emerged as an important tool of competition in achieving sales. Data are usually available showing how the level of customer satisfaction in handling complaints is related to lost sales.

According to the American Management Association survey (Juran & Gryna, 1993), there are many companies do not regularly count, track, report the response times of complaints. In fact, 64.8 % of the surveyed companies track response time of complaints. The concepts of quality improvement can help to improve the process of handling complaints. In an application at the Mobil Chemical Company Films Division, the average response time on complaints was reduced from 92 to 30 days (Juran & Gryna, 1993).

2.8 Consumer affairs

Crosby(1979) had defined the consumer affair as a professional quality function. It involves the identification, investigation, resolution, and future prevention of customer's problems. These actions require most professional experience and training. There are three basic action phase in consumer affairs;

1. Prevention. This involves monitoring advertising claims, taking affirmative action in providing customer information and education on using product or service; establishing early warning systems to detect any potential problems; and running a quality management system
2. Awareness. Create ease of communication so customer can easily reach us and inform the problem whether by telephone, mail, email, verbal. A return contact must be made within 24 hours.
3. Correction. Satisfy a complaint fully, as quickly as possible. The system that produced the problem must also be corrected in order to prevent the reoccurrence of problems.

2.9 Australian Standard on complaint handling

Australian standard AS 4269-1995 involved the complaint handling. It was prepared by the Standards Australia Committee on Complaints Handlings. It is also regarded as one of the components of competitiveness in domestic and international markets.

The standard is used as the reference on the best practices for implementing the complaints handling system. The expected outcome of the standard is for the organization which implements complaints handling processes in accordance with the

standard would be continuous improvement in consumer satisfaction, both with complaints handling and with the products and service.

The following contents lie in the standard;

- Scope and purpose
- Essential element of effective complaint handling
- Implementation of the essential elements
- Complaint handling procedures
- Disputes

The keys criteria of the complaint handling process as stated in the AS 4269 is the key of designing complaint handling process. Following criteria should be followed;

- The complaint handling system should be visible amongst the organization and also customer.
- The complaint should be treated fairly while maintaining the customer's right and adequately required support.
- The complaint handling system should be documented where the data collection and can be done and analysed.

There are guidelines for the complaint procedures recommended in the AS 4269.

1. Processing oral complaints. The steps are

- identify yourself, listen and record what the complainant wants
- confirm the received detail
- empathize with the complainant in a courteous manner
- explain the courses of action available
- Do not attempt to lay blame or be defensive.
- Resolve the complaint if possible or commit to doing something immediately, irrespectively of who will actually handle complaint.
- Ensure that the consumer is informed the complaint is receiving attention, without creating false expectations.
- Check whether the consumer is satisfied with the proposed action and, if not, advise alternative courses of action.
- Provide acknowledgement; e.g. a thank-you letter, a telephone call.
- Follow up as appropriate and monitor to ensure the consumer remains satisfied as well as receives feedback.

2. Processing written complaints. The process is similar to oral complaint, anyhow, the response should be given promptly in writing.

3. Minimizing disputes. Handling the difficult consumer required skill and patience. Keep avoiding the negative position it will become more negative and creating the disputes. Two main elements to minimizing disputes are 1.) Dealing with the complainant's feeling and 2.) Dealing with the specific of complaint.

2.10 Characteristics of a process

The principles of process management have their origin in the characteristics of a well-managed manufacturing process. To identify its general attributes and develop a foundation for process management, it is referred to the features from manufacturing process

1. Clearly defined ownership. The recent approach is management ownership has been given away to empowered work groups and self-directed work teams where employees are assuming some of the traditional roles of management. A process owner, as individual or a team, is fully responsible for yield, quality etc.
2. Defined boundaries. The lack of understanding of requirements on either the input side or output side underlies many business processes. In the well-managed process, the problems can be minimized through clearly specifying the work product as it proceeds from one to another.
3. Documented flow of work. Document provides the permanent record of the way information and physical transformation take places. It provides the reference as a means of replicating the process. And it is also used to provide the training aid for the personal involved in the process. Typical document is flow chart.
4. Established control point. It serves as a mean of regulating the quality of work. Because of natural variation that occurs in physical processes, control point is used to manage the variation.
5. Established measurements. It provides a statistical basis of controlling the flow of work and managing variation.
6. Control of process deviations. In the well managed process, the corrective action is performed when the undesirable variation occurs.

2.11 Work flow and Organizational Structure

Process always relates to inter-department activities. The organization may create weakness as each department focus on their own means rather than the broader ends of the organization. These tendencies attribute to the following conditions

1. A reward system within the function may encourage the employee's performance to be based on quantity rather than quality.
2. Group behavior may create the boundaries against other groups in the organisation.
3. Culture or behavior in the function such as service mind, level of helpfulness.
4. The degree of decentralization of the organization. The highly decentralized organization tends to create the antagonism approach against other groups.

2.12 Flow charts and symbols

Flowcharts are a graphic way to describe a group of transformations in the system. The purpose is to provide the symbolic representation of all activities performed in sequence.

There were two types of flow charts. The traditional types and the information flow chart type. Two primary symbols are used in information flowcharting: the rectangle and the diamond. The rectangle, known as process block, is employed here to describe a conversion activity. The diamond is used to denote a control activity such as acceptance and rejection.

2.13 Measures of conformance

Conformance measures involve an inspection and verification whether the product or service meets either specifications and requirements. When the output is defined as the nonconformance, there are three situations can occur;

- Work is accepted as it is
- Work is rejected and returned to the producer

- Work is accepted by the customer and modified to conform to some desired state or condition.

2.14 Measure of response time

Response is measured from arrival of the request until the completion of service or from the start of the actual performance of service until completion. It provides the competitive edge and serves to differentiate a firm from its competitors. Response or cycle time is generally an important measure for most service and support type of operations.

2.15 Measure of cost

Cost is the important measure of business performance. As discussed above quality is tangible and can be measured as cost, called cost of quality. It has provided the important business approach for assessing the economic impact of nonconformance. For example, cost associated with scrap and rework of material, documentation errors, service and administrative errors of various kinds.

Cost of quality are divided into three major areas

1. Failure or nonconformance costs. Failure costs are those directly related to not meeting requirements. Cost of nonconforming product and material scrap and fixing defects or errors. Failure cost can be divided into costs of internal and external failure to enable management to focus on the appropriate areas of the business. An external failure cost would be the warranty claims, complaints. An internal failure cost would be the scrap cost incurred because using faulty material or generating scrap during production process.
2. Appraisal cost. Appraisal costs are those costs attributed to human and machine activity required to detect nonconforming product in work. This includes the labor cost for inspecting goods as well.
3. Preventive cost. Costs associated with preventing future occurrences of nonconforming products. This includes the cost of process improvement. Typically it is found that the preventive cost is far less than the cost occurred as the failure cost and appraisal cost.

The cost of quality approach provides the way to determine the areas of operation that are creating the waste and required improvement. It can be considered as saving in the failure and appraisal cost when invest in preventive cost.

2.16 Process Analysis

Process analysis is the systematic way of defining the activities and tasks within an operation. It was originally proposed by the Gilbreths (Melan, 1993) for improving product cost. Analyzing the flow of work is also fundamental in process improvement.

2.16.1 Process analysis procedure

The process is examined by going through the following steps

1. Select the particular process to be studied
2. Determine the objective of the analysis
3. Describe the operations involved of mean of process flow charts.
4. Assess the process and evaluate opportunities for improvement.
5. Obtain management approval for the proposed improvement.
6. Implement the improvement.

Work tasks are determined by interviewing the people actually performing them. Interviewing is the main approach used when accurate and up to date process documentation does not exist. The series of basic questions covering the what, who, where, when and how of the process. The following table shows the various kinds of question asked.

Table 2.3 Questioning techniques

- | |
|--|
| <ol style="list-style-type: none"> 1. What is the activity? What is the purpose of it? Why is it done? What would happen if it were not done? Is every part of the process necessary? 2. Who does the work? Why does this person do it? Is there some body who could do it better? Can changes be made to permit a lesser skilled person to do the work? 3. Where is the work done? Why is it done there? Could it be done elsewhere at lower cost? |
|--|

4. When is the work done? Why should it be done then? Could it be done better at another time?
5. How is the activity performed? Why is it done this way? Can it be combined with another activity?

Source ; Melan (1993)

2.17 Cause-and-effect diagram analysis

Cause-and-effect diagrams were developed by Kauro Ishikawa of Tokyo University in 1943 and thus are often called “Ishikawa Diagrams”. They are also known as fishbone diagrams because of their appearance. Cause-and-effect diagrams are used to systematically list the different causes that can be attributed to a problem (or an effect). A cause-and-effect diagram can aid in identifying the reasons why a process goes out of control.

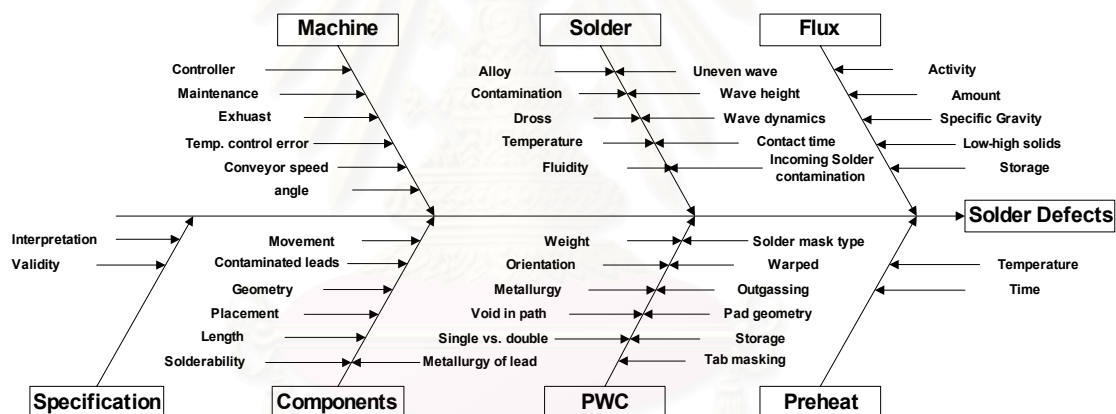


Figure 2.1 Ishikawa cause-and-effect diagram

Source : Juran and Gryna (1993)

2.18 Pareto analysis

According to Hafner (2001), Pareto analysis is named following the Italian economist, Vilfredo Pareto who observed that twenty percent of the Italian people owned eighty percent of their country's accumulated wealth. Overtime that becomes the principle of 80-20 rule or Vital Few and Trivial Many rule. Pareto's rule states that a small number of causes is responsible for a large percentage of the effect, in a ratio of about 20:80. Pareto charts are used to display the Pareto principle in action,

arranging data so that the few vital factors that are causing most of the problems reveal themselves. Concentrating improvement efforts on these few will have a greater impact and be more cost-effective than undirected efforts.

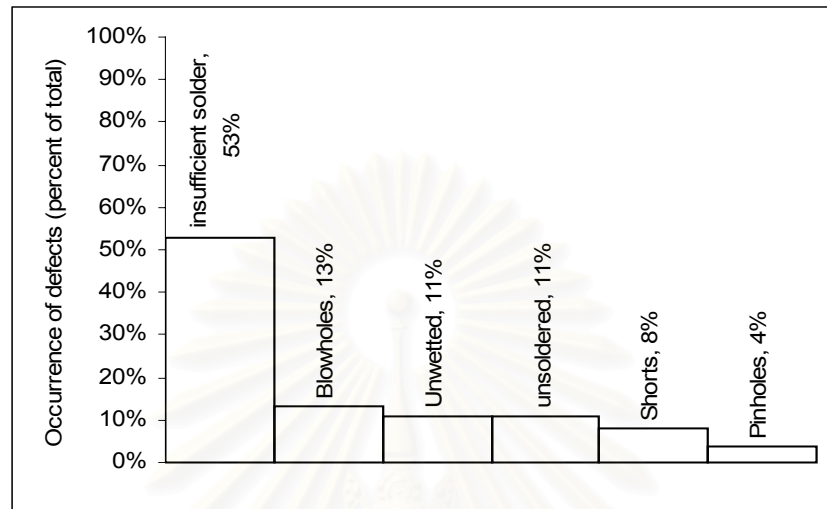


Figure 2.2 Pareto Analysis

Source : Juran and Gryna (1993)

2.19 3M (Muri, Mura, Muda) techniques

Using the method of 3M by eliminating the following situations in the process;

1. Muri – Overburdening due to pushing a machine or person beyond natural limits
2. Mura – Unnatural or inequality
3. Muda – Waste or doing thing that does not add value

According to Kitano (1997), the 3M techniques can be avoided as the following discussion

Muri can be avoided through the standardization work that must be defined with work flow, repeatable process steps and target time.

Mura can be avoided by using Just in time system which base on

- Little or no inventory
- Supplying the process with the right part, at the right time, in the right amount
- First in - first out flow

Muda can be eliminated after the application of Muri and Mura. Muda must be fed back to the Muri for planning of solutions.

In conclusion, the 3M techniques also connect to the Deming cycle “PDCA”.

- Plan means to avoid Muri, or unreasonableness
- Do means to avoid Mura, or to control inconsistencies
- Check means to avoid Muda, or to find waste in outcomes
- Action indicates the will, motivation, and determination of the Management.

2.20 Data flow diagram

Data flow diagram (DFD) is one of the system development tools. In designing a database, the data flow diagram can identify the flow of the data in a system without specifying the media or hardware involved. It uses a few symbols connected by arrows to represent such flows.

According to Long (1989), there are four symbols are needed for data flow diagrams

Entity – is the source or destination of data or information flow. It can be a person, a group of persons, a department or even a place.

Process – Typical process includes, enter data, calculate, store, create, produce and verify.

Flow line – or data flow, indicates the flow and direction of data or information

Data store – identify storage locations of data which could be a file drawer, a shelf, a database on magnetic disk etc.

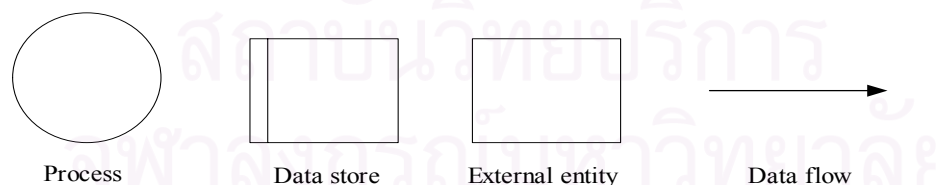


Figure 2.3 Symbols in data flow diagram

2.21 Literature review

As previously discussed, the complaint management system is one of the areas that importance to the business since it affects the customer satisfaction. Quality

techniques can be used in this area. There are close relationship between quality, customer satisfaction and sales.

There are several studies about quality, sales and customer satisfaction. Chumpa (1998) used the Quality Function Deployment to improve the sales system in his research. His research clearly demonstrates the development in sales system which leads to better quality and lower cost to the business.

Therathanawat (1997) outlined the importance of corporation between Sales and Production department. It was found that the studied company lack of appropriate planning, organization structure and information system. The development of the new organization structure and implement the Information system which provides lower inventory and overhead. It also results in time reduction of production and product delivery, which can improve customer satisfaction by 25 %.

Some others studies outlined the systematic ways to reduce the complaint by eliminating defects. Nonceeya (1999) had studied about reducing complaint which is normal caused by non-conforming product and results in customer dissatisfaction. Complaints prevention are divided in two types, the prevention from recurrence and the prevention of new type of complaint. The PDCA technique is used for the prevention of recurrence. FMEA, Cause & effect diagram and Mistake-proofing system techniques are used for the prevention of new type of complaint. The result shows the complaint do not exist in the research period.

There is another studies related to this research. Surijamongkol (1999) had used FMEA and Fault Tree Analysis (FTA) techniques as a quality tools and found three major problems in the application software development of the distributed control system in a manufacturing company. These are (1) Lack of procedure to control the project execution (2) lack of the document and data control, and (3) technical problem. The result is the establishment of Quality assurance system which includes checklists, standard document and procedures and the engineering database pool software (EDP). The implementation of the Quality system assurance is the 40 % reduction of error and 33 to 90 % in Risk Priority Number (RPN).

This study involves in the data collection in order to measure the process improvement. There are others studies related to this study. Tangwiwatwong (1999) studied the data collection system for warehouse activities. Data collecting system for study warehouse activities is developed. The study identifies the objective of each

activity together with the performance assessment criteria including the average time. In order to process for this assessment, required raw data were known as two types, one-time-collected raw data and continuously collected data. For the one-time-collected-data, the questionnaire forms were developed to study data from general warehouse information. For the other type, forms were designed in table format to collect the activities in the studied warehouse. Data processing method was also developed for this second type of data. Finally the form, that was developed in the study, were applied to an actual warehouse to demonstrate performance assessment for system testing. Jetvijitr (1992) had studied the studies the standard time for the particular process to determine the productivity improvement in the Air-conditioning manufacturing company. Maynard Operation Sequence Technique (MOST) is used to measure the work by collecting each individual activity. Only the productive activity will be measured as standard time. The result of this study leads to improving productivity.



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER 3

OVERVIEW OF COMPLAINT HANDLING SYSTEM

3.1 Company background

BST is a joint venture company in Thailand. It has the head office in Australia. BST was established in 1995 to manufacture metallic coated steel and prepainted metallic coated steel products in Thailand. The following is general summary of the business

Investment	5,000 million Baht (supported by Board of Investment)
Area	257,600 sqm
Employees	200

Production capacity

Hot rolled steel – pickle and oil process	350,000 Tpa
Cold rolling mill (four high reversing mill)	300,000 Tpa
Metallic coating	150,000 Tpa
Organic finishing (paint line)	50,000 Tpa

The products are well known as the superior material for many applications, such as roofing, and have been marketed globally for metallic coated steel and prepainted metallic coated steel. These coated products are the results of extensive research and development in order to find the superior solution of industrial material. The coating is the alloy of Aluminium and Zinc which provides superior corrosion protection over the steel base.

The Product is supplied to customer in coil from the BST's steel mill located in Maptaphut industrial estate, 200 km east of Bangkok. The product is sold in weight based unit, which is normally quoted in Baht per metric ton. A minimum order is 20 ton. The customer will use the steel coil as material for forming process to produce the required shape. There are also customers who use coated steel product for other applications apart from roofing & construction such as general decoration, appliance parts, shutter doors etc.



Figure 3.1 Coated steel coil



Figure 3.2 Steel roof

3.1.1 Company's customer sections

The company has multi-channels of supplies according to customer section. Normal the customers of the company can be divided into two major sections which are

- Domestic. Domestic customers are considered the major group of customer to the business. They can also be divided into further subsection such as roofing customers, appliance parts manufacturers customer, or coil service center customer.
- Export. Export customers, compared to the domestic customer, are normally buying in larger volume. This is due to the nature that the export supplies involve the significant high cost of transportation. The delivery lead time is also much longer than domestic. In order to minimize the cost, the customers always deal with spot and large amount of order. Anyhow, the number of

export customer is not as much as domestic customer, so the total volume supplied into export market is lower than domestic customers.

3.1.2 Company organisation

Company organisation of the case study is very similar to the typical type of company structure. The structure contains five different departments as following;

1. Sales and Marketing - located in the sales and marketing office, Bangkok
2. Human resource - located in the factory area, Map ta phut industrial estate, Rayong
3. Manufacturing - located in the factory area, Map ta phut industrial estate, Rayong
4. Finance - located in the factory area, Map ta phut industrial estate, Rayong
5. Logistics - located in the factory area, Map ta phut industrial estate, Rayong

Since there are two offices for the company, some departments are located away from the others. This situation affects the efficiency of the process which involved inter-department activity. Since the communication is limited from the face to face contact. Anyhow, the use of the Information Technology system provides the benefit against the limitation in communication.

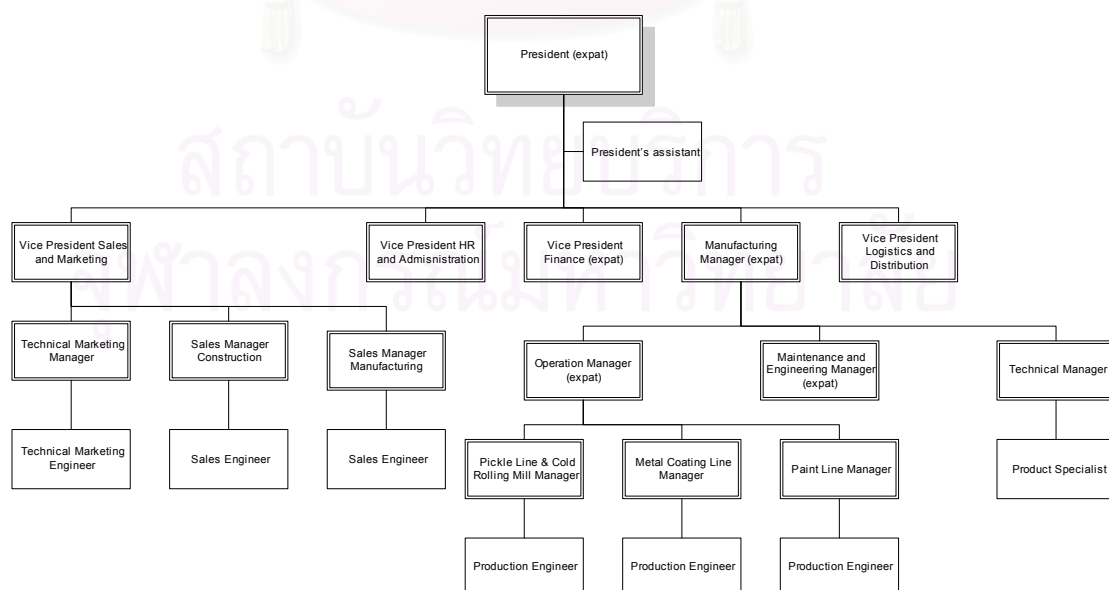


Figure 3.3 Company organisation

3.1.3 Product and process

The product for this particular steel company is the cold rolled steel sheet, coated with metallic coating for corrosion resistance purpose. Partially the metallic coated steel is painted to provide the shade to the product and the additional corrosion resistance. Hence the following process diagram is showing the overall processes.

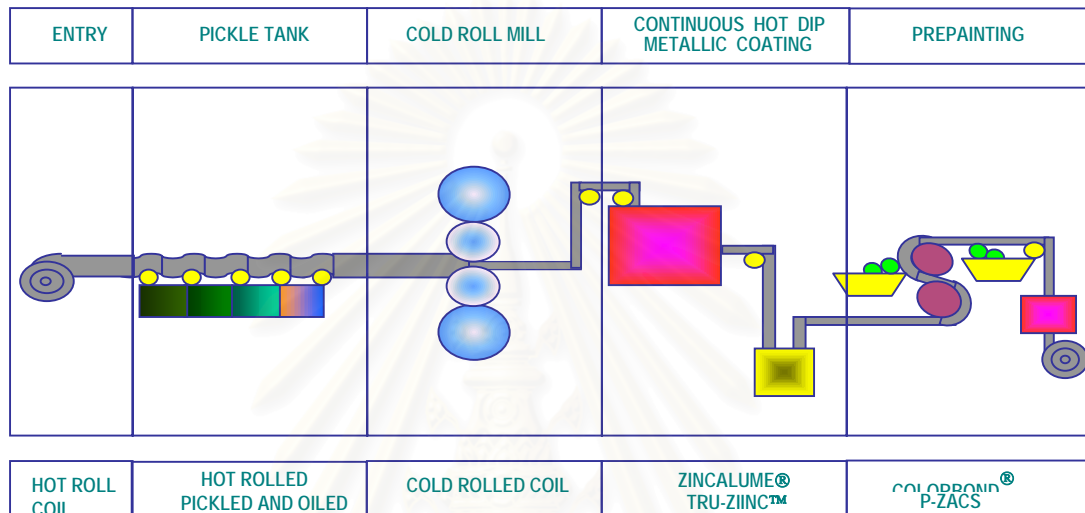


Figure 3.4 Production process

There are four production lines in sequence. All of them are located in the same area. Following is the explanation of the production lines.

1. Pickle line. The major raw material for this process is hot rolled steel. Hot rolled steel comes in coil on the truck. Apparently the steel always rust, so normally the supplied hot rolled coils always comes with rusty surface (or technically called “scale”). The process involves the surface cleaning process using acid bath tank to remove the oxide of steel. Normally the feed thickness is 1.6-3.0 mm while the width is supported up to 1300 mm .

2. Cold rolling mill. The cold rolling mill is one of the major processes. It comprises four-high strands mill. The mill rolls the pickled hot rolled steel down to the required thickness. The process is also called the cold reduction due to it reduces steel thickness without applying heat into the process. The current capability of the process is rolling steel down to 0.20 -1.5 mm range of thickness.

3. Metal coating line. The process applies coating to the cold rolled steel. The coating can be either Zinc or alloy of Zinc/aluminium. The steel strip is fed into the molten bath of metallic coating. Then the molten coating is wetted all over the steel surface. After that, the steel is cooled down under the controlled condition, so the metallic coating also becomes solid coating on the steel surface. The process is called hot-dipped metallic coating process. Finished product form this process can be either supplied directly to the customer or pass to the paint line for further process.

4. Paint line. Paint line applies paint on the surface of metallic coated steel coils. Paint includes primer, top coat and backing coat. Wet paint is applied to the coil surface using rollers. Then the coil is passed into the heating oven to cure the paint. Appropriate cured paint will provide the long lasting beauty to the product.

3.1.4 Product characteristics

According to the process, the following diagram shows the characteristics of the product for further understanding

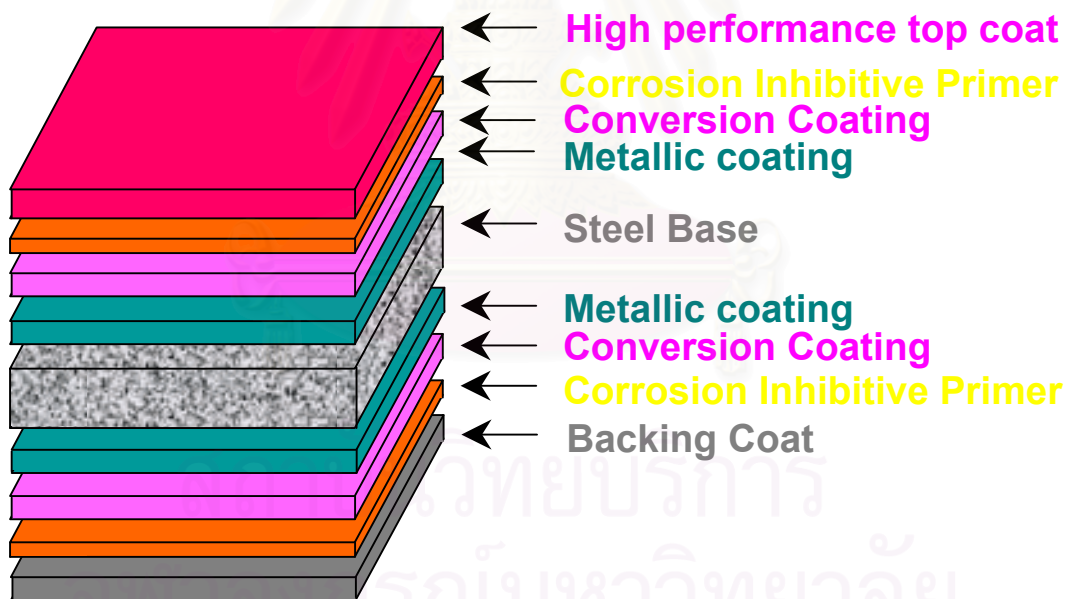


Figure 3.5 Layers of Pre-painted - Metallic coated steel

3.2 Reference product standards

There are reference standards used for manufacturing the product. The following standards are quoted as the referred standard.

3.2.1 AS 1365:1996 Tolerances for flat-rolled steel products

The standard specified dimensional tolerances for flat rolled steels (uncoated, metallic coated or organic-coated) other than stainless, high alloy and quenched and tempered steels. There are 6 criteria to be considered following to this standard

1. Thickness tolerances
2. Width tolerances
3. Length tolerances
4. Flatness tolerances
5. Edge camber tolerance
6. Out-of-square tolerances

3.2.2 AS 1397:1993 Steel sheet and strip – Hot-dipped Zinc coated or aluminium/zinc coated

The standard specified the requirements for hot-dipped zinc-coated or aluminium/zinc coated steel sheet and strip, supplied in thickness up to and including 5.0mm. There are two major section in the standard to determine the requirements of the product

Section 1: The steel base. The standard specifies the requirements of the steel base used for hot dipped coating product by four criteria.

1. Chemical composition of the steel base
2. Tensile test
3. Bend test
4. Dimensional tolerances

Section 2: The coating. In the coating section, the standard specifies the requirement of the coating in two criteria.

1. The coating mass tolerance. The standard specifies requirement of amount of coating coated on the surface.
2. The coating adhesion. The standard specifies the test to determine the adhesion of the coating and the steel base.

3.2.3 AS 2728:1997 Prefinished/prepainted sheet metal products for interior/exterior building applications – Performance requirements

The standard specifies performance requirements for prepainted and organic film/metal laminate products in sheet and strip form that are coated on one or both

sides with as organic film, and that are intended for fabrication into products for use in the construction or finishing of buildings.

The following performance criteria are identified in the standard

1. Appearance
2. Specular gloss
3. Dry Film Thickness
4. Reverse impact resistance of prepainted products
5. Adhesion
6. Scratch resistance
7. Durability of the organic film
8. Humidity resistance
9. Salt spray resistance
10. Pencil hardness

3.3 Procedure for customer complaint resolution

The company complaint procedure was controlled established and controlled by technical manager. It was documented under the code PRO-TE-CCP-0020-E, called Procedure for customer complaint resolution. It was designed to handling the customer complaints to the company regarding both products and services complaints. According to the procedure, there are four departments involved in the complaints handling process. In each individual department, there also be many sections in the department.

The complaint handing procedure involves totally of six sections from four departments which are;

1. Sales section of marketing and sales department
2. Technical marketing section of marketing and sales department
3. Customer services section of logistics department
4. Technical sections of manufacturing department
5. Production section of manufacturing department
6. Credit controller section of finance department

The following is the explanation of step by step action identified in the Procedure for customer complaint resolution

3.3.1 Intent of the procedure

This procedure is used to initiate a customer complaint involving the company's product to ensure that all steps to be followed and managed as well as investigated and resolved the complaint.

3.3.2 Definitions

“Customer Complaint” is a situation where the quality or product attributes of a product do not fully meet the expectations of an end user.

3.3.3 Responsibility

This procedure applies to all personnel who inspect, report or investigate a customer complaint that occurs at any direct customer or processor of the company's product.

3.3.4 Procedure

All complaint entered against the company must be initiated on an individual basis (i.e. claim by claim) by the company's Sales Representative.

When the complaint has been acknowledged by the company's Sales Representative, an initial inspection should be done, a sample or photo obtained and the customer complaint form must be filled out.

Form FRM-TE-CCP-0020-E (Customer Complaint Initiation) as well as the customer complaint request form must be completed for every complaint and passed on to the Technical Marketing Engineer for adding to the records. Page 1 of the form should be filled out completely (including the complaint number field) during initial contact with the customer.

The samples or photographs of the defective condition must be submitted to the Senior Product Specialist in conjunction with the complaint initiation form. Each sample or photo must be labeled with the coil and work order numbers. The Product Specialist will make preliminary investigation whether the complaint could be caused by the company's production process and record the complaint then the complaint will be forwarded to the Production Line Manager for detailed investigation. Depending upon the severity of a complaint, a technical visit by

Production Engineer and/or Product Specialist (along with the Sales Representative) may be required to resolve the complaint.

After Production Line Manager receive the complaint information from Product Specialist, if the complaint can be justified before full investigation, the “Justify Complaint” field at bottom of page 1 of form FRM-TE-CCP-0020-E (Customer Complaint Initiation) would be filled out and signed off by the Production Manager and the Manufacturing Manager then sent to the Senior Product Specialist

The full detail of Technical Complaint investigation and corrective action plan will be executed by responsible Production Engineer within one week after getting the complete necessary information and sample.

After the approval by the Manufacturing Manager, the Technical complaint investigation and corrective action plan will be sent to the Technical Marketing Engineer to forward for financial compensation. If the complaint is decided to have a financial compensation, then the claim amount will be settled by the Marketing personnel with the approval of the Marketing Manager.

If the complaint is decided to get the product back from the customer, the Goods Return procedure must be followed with cooperation of Customer Services.

The financial resolution of all customer complaints, including executive approvals must be copied to Technical Marketing Engineer who will prepare a monthly summary of claims and complaint costs for Monthly Complaint Review Meeting.

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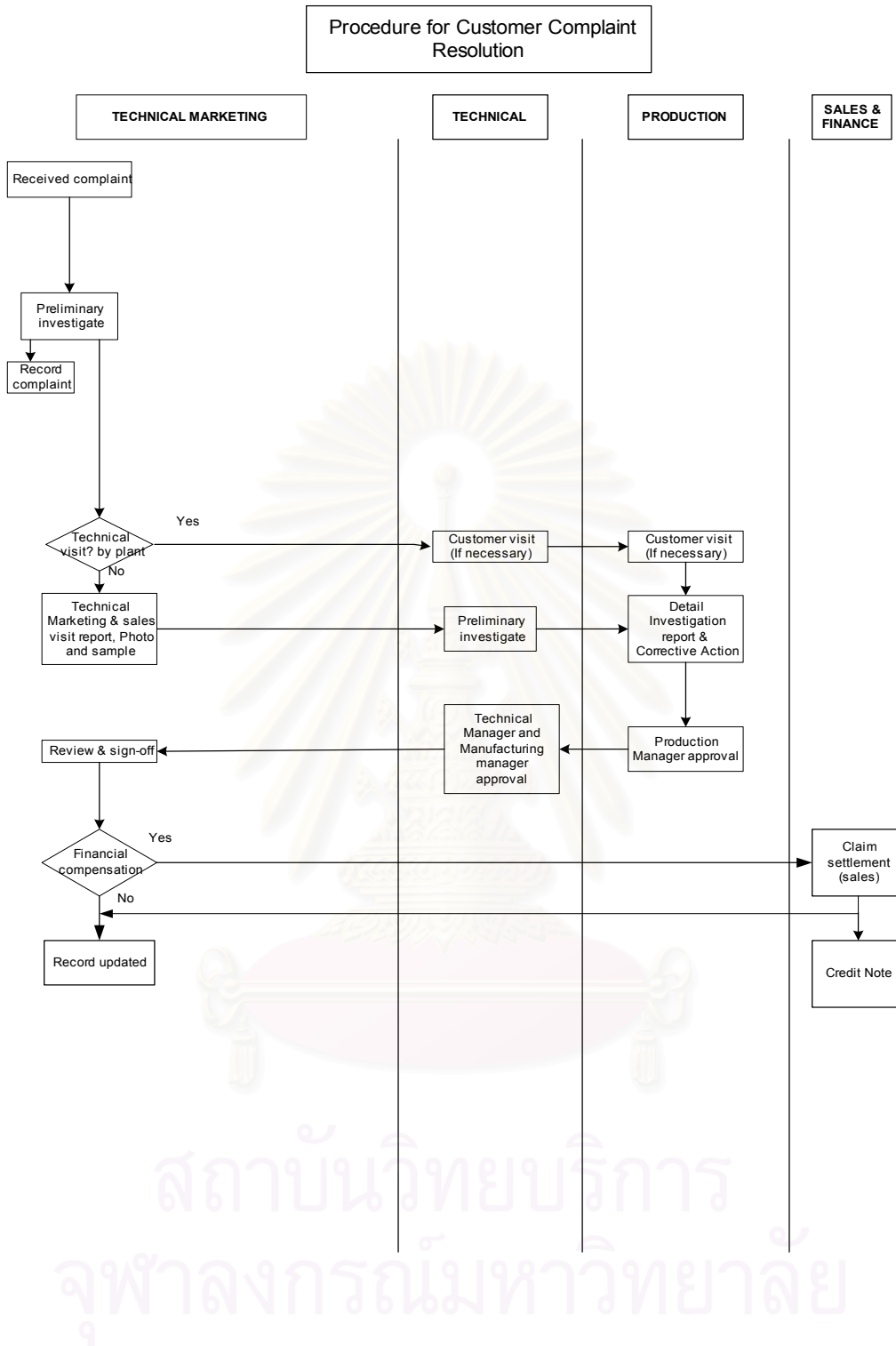


Figure 3.6 Existing complaint procedure

CHAPTER 4

DATA COLLECTION AND ANALYSIS

This chapter will be discussing about the data collected for the study. The collection started on January of 2001 to March 2001, or three months. The data will be used to analyze the process and identified the improvement in the next chapter.

4.1 Types of data

According to there are many types of complaints due to many types of defects which is typically happen to the steel business, it is better to capture the whole picture of the complaint management system rather than dealing with specific types of defect. The initial study is to collect data regarding the key measurement of the complaints, which can be determined as direct impact to customer and the company's business. The key measurements are as following;

- Number of complaints
- Volume of product
- Time to response to customer
- Amount of claim settlement

4.1.1 Number of complaints

The number of the complaints issued by customer to the company is the major key measurement. Company should measure how much complaints issued and regularly record them. Without this measurement, company will find difficulty to understand it is situation in quality of the product and service.

4.1.2 Volume of non-conforming product in each complaint

Another key measurement of the complaint is the volume of product involved in each complaint. In the case of steel business, normal measurement of the volume of the product is tonnage. Since the steel product is sold in tonnage unit.

The tonnage of product recorded in each complaint can be divided in two types,

First is the tonnage customer complains to the company. This figure means the tonnage customer originally quoted as defective and require the company to claim.

Second is the tonnage of product that the company justifies as defective. In the steel business, the product can be used in many different functions. For example, Company's steel products are used by customer for roll forming as a roof sheet. The other customer may cut the steel and form them into appliance parts. Some of them may use the steel sheet as air condition ducting. There also be many others application we may not imagine of. Those have many different requirements. Then sometimes the customers found that the product are not fully satisfying their manufacturing process. They tend to believe that the steel product is defective and require the claim settlement. In order to minimize the difficulties, the steel product is normally sold based on the quoted standard. When customers buy the product, the product is sold under the agreed standard between company and customer. In this case, company normally quotes the Australian standard which has been discussed earlier. In some special case, the company may supply the product under alternative standard such as Japanese Industrial Standard (JIS) or American Society of Testing and Materials (ASTM). So, whenever there is a complaint from customer, the justification is based on the conformance to the agreement between customer and company, on the other hand, the conformance to the proposed standard. Then it is found that sometimes, even the company is selling the product exactly conforming to the agreed standard, customer may raise complaint where they found the product cannot be used. In such case, the complaint cannot be justified and the company still has the right not to settle the claim for customer.

Both types of volume are recorded in the complaint handling system of the company.

4.1.3 Time of response to customer

According to the complaint resolution procedure, once the customer issues the company a complaint, the complaint will be processed for the investigation. As we find the complaints justification can be result in both ways, accept or not accept claim. The key information customer would like to know at the first stage is whether or not the complaint is justified. After that, customer may be interested to know what

was wrong with the product and how the company acts to resolve it at the lesser priority.

In order to answer the customer regarding the complaint justification, the complaint need to be investigated, and investigation process takes time to finish. So the key measurements of the complaint management is to measure how fast the company can reply the complaint justification to the customer. The fastness of the answer can be a serious issue with customers. If the customer is spending too long time for waiting answer from the company, customer may feel unsatisfied.

4.1.4 The amount of claim settlement

For the justified complaint, the customer will be informed the justification result. In order to reach the win-win approach, customer maintains the right to choose whether to return of the defective product, or accept to use as it is with or without discount. This is also based on the negotiation of the company representative. Sometimes returning the product is not the best solution for the company since the steel product may not be easy to rework. Then any discount offered to customer is the preferred option.

So the measurement for the cost of complaint, which is directly related to the figure indicated in the Credit Note, can be divided in two categories.

- The credit note issued for returning the defective product.
- The credit note issued for discounting the defective product.

4.2 Data collection

4.2.1 Complaint Status Update

The writer has designed the complaint status update file. The complaint update file was used to record the status of the complaints by weekly basis. It is created and updated by technical marketing engineer of the company. Once every week, the technical marketing engineer will check the status of pending complaints from the responsible staff and record them into the file. Then the file will be distributed to the involved person in order to provide the information of complaints status.

After there is the requirement to improve the complaint resolution system, the measurement of the existing system is collected. During the study, the selected period is January of 2001 until end of March 2001.

The data can be shown as following

Table 4.1 Complaint data of January 2001 - March 2001

Complaint No	Input Date	Product	Defect	Complaint Tonnage	Total Paid Value (Bht)
01C001	5-Jan-01	CB	Colour variation	100.225	216865.35
01C002	5-Jan-01	CB	Colour variation	43.487	0
01C003	5-Jan-01	CB	Paint peel off	25.965	0
01C004	15-Jan-01	Mix	Wrong coil dispatched	64.318	1712664.04
01C005	16-Jan-01	TZ	White rust	13.875	0
01C006	16-Jan-01	TZ	Edge Damage	9.61	0
01C007	16-Jan-01	ZL	Black rust	877.121	0
01C008	16-Jan-01	HRPO	Surface Stain	43.93	0
01C009	18-Jan-01	CRP	Weight loss	0.109	3771.4
01C010	18-Jan-01	Zacs Ap150	Edge built up	4.584	0
01C011	16-Jan-01	TZ	Excessive oil applied	53.536	0
01C012	26-Jan-01	Zacs RW70	Low resin applied	8.544	251456.94
01C013	8-Jan-01	TZ	Dent	9.744	504477.58
01C014	1-Feb-01	CRP	Excessive width & Marking	0	0
01C015	5-Feb-01	ZL	Low resin	6.036	988454
01C016	7-Feb-01	CRFH	Uncoated	4	104339.25
01C017	9-Feb-01	CRFH	Off gauge	25.5	0
01C018	13-Feb-01	SHX	Non-skin passed	4.66	32154
01C019	13-Feb-01	ZA	Metal spots	1.855	46826.8
01C020	13-Feb-01	ZA	Resin roll mark	0.854	23122.05

01C021	13-Feb-01	SHX	Wrong document	0.353	10554.7
01C022	13-Feb-01	ZL sec	Wrong product dispatched	10.552	13491.825
01C023	13-Feb-01	CRFH	steel debris in coil	9.55	145637.5
01C024	13-Feb-01	ZL sec	painted area in unpainted product	2.1	0
01C025	13-Feb-01	Zacs rw100	No resin	9.247	19213.6
01C026	14-Feb-01	ZL surplus	Wrong coils	12.117	243980
01C027	15-Feb-01	SHX	Off gauge	2.772	0
01C028	22-Feb-01	CRFH	Edge Wave	38.258	0
01C029	23-Feb-01	ZL sec	Off gauge	2.532	2532
01C030	23-Feb-01	Zacs AP150	Edge wave	2.2	59780
01C031	27-Feb-01	TZ	Wash Pattern	41.2	28840
01C032	26-Feb-01	ZL	Uncoated	0.176	5280
01C033	7-Mar-01	CCB	Uncoated	0.25	0
01C034	7-Mar-01	CCB	Corrosion	0	0
01C035	7-Mar-01	RB	Low thickness	13.455	0
01C036	7-Mar-01	ZL	Coating peel	4.145	0
01C037	7-Mar-01	ZL	Galling	3.359	91784.67
01C038	7-Mar-01	ZL	Wrong coil	7.674	15348
01C039	7-Mar-01	Zacs Ap150	Dent	2.8	82600
01C040	7-Mar-01	ZACS AP150	Dross&metal spots	3.078	16951.7

01C042	2-Mar-01	CRFH	Wrong coil	12.79	14388.75
01C043	13-Mar-01	PZACS SC70	Crack during forming	2.446	0
01C044	21-Mar-01	CRP	Colour variation	6.289	203763.6
01C045	23-Mar-01	TZ	Dent	17.798	0
01C046	23-Mar-01	CRP	Colour variation	25.598	630555.9
01C047	26-Mar-01	ZACS RW 70	Darkening	2.23	54750
01C048	26-Mar-01	SHX	White mark	2	0
01C049	26-Mar-01	SHX	White mark	5.092	148587.2
01C050	28-Mar-01	TZ	Weight loss	0.044	787.6
Total				1538.058	5672958.455

According to the collected data, it was found that the measurements are as in the following topic

4.2.2 Number of complaints in the study period

During the study period in January of 2001 until March of 2001, there were a total of 49 complaints registered into the process. It should be noted that the complaint running number is used in sequence from 01C001 to 01C050. The complaint number 01C041 was used mistakenly duplicated, so it is corrected and left blank.

In the total of 49 complaints, 35 complaints were issued by domestic customers. The balances of 14 complaints were issued by export customers.

4.2.3 Volume of complaints in the study period

There were totally 1538.058 tones of steel issued for complaints. Some complaint is as much as 800 T. As previously discussed, not all complaints are accepted.

4.2.4 Amount of claim settlement in the study period

The amount of claim response, as explained, can be divided into two types;

The claims for returning defective product

There are complaints that the defective product needed to be return for total amount of 4974850.2 baht. When considered the tonnage of returned defective product, it is 168.909 tones.

The claims for discounting defective product

For domestic customers, it is found that there complaints needed to issue the discount for customer for 362514.87 baht. This figure are related to the discounted of product 77.15 tones

For export customers, it is found that there are complaints needed to issue the discount for customer for 698108.22 baht which related to 133.427 tones of claim

From the above figure, there are signs that the nature of claim to domestic customers and export customers are different. Since the tonnage of complaint from export customers seems to be outnumber the domestic complaints, they are unlikely to be justified due to the possibly reasons of;

1. Export product involves number of handling and processes. The defect is likely being caused after trade or dispatched from the factory.
2. Export customer always order in larger volume. Their consumption may not cope up with the order volume. But in order to save cost, customer must order larger than they consumption capability is short term. So the product may have been kept for long time and being deteriorated.
3. The customer may tend to over claim the complaint number due to they aware of the limitation of investigation from the manufacturers.

4.2.5 Time to respond to complaint in the study period

The time to respond to complaint to customer is measured as starting from the date customer issue the complaint to the company. Customers may issue complaint in many ways, such as telephone, fax, letter, email or complaint face to face during sales

visiting. The complaints are recorded and registered for further investigation. The processing time involves two main functions, the preliminary investigation and the full investigation with the corrective action. Once both processes are finished, the customers will be informed the investigation result.

4.3 Time to response to customer analysis

According to the procedure, the monthly summary of complaint is created for reporting to the manager. During January 2001 to March 2001, Weekly update between production engineer and technical marketing engineer is set. The update is done either by telephone call and meeting between production engineer and technical marketing engineer groups. The information is recorded during the update session especially regarding the detail of each complaint.

Then the weekly updates of each complaint are analyzed to find the time of each activity in the process.

When consider the time spent for investigation, there are many detail activities taken step by step in order to complete the full investigation and determine the corrective action. Each activity spends considerable time to complete. And in order to study the system and determine the improvement of the process, it is inevitable to track the time for each activity and determine the problem causing the time spending of each activity.

During the study period, it is found that there are typical activities contained in the investigation and corrective action determination process. The following are the activities happened step by step.

4.3.1 Preliminary investigation

As written in the procedure, once the complaint is raised, technical marketing engineer will start preliminary investigate the complaint. The Technical marketing engineer will find the general information such as the types of the product, the defect characteristics. This incorporates the customer visiting by technical marketing engineer in order to find the detail of complaint as much as possible. Sometimes the production engineer and/or the product specialist from the factory are requested to join the visit where the complaint seems to be serious and specific action need to be taken. The photos and samples are the always collected since they are important to the

investigation process for production engineer. Samples may be brought along with the engineers or sometimes the customer may deliver them to the office later.

4.3.2 Samples and Photos delivery

Photos and samples of the defective product will be delivered to the product specialist and plant engineers for detail investigation. Since the factory is located in Rayong, ~200 km from Bangkok where marketing office is located, normally both sites communicate to each other using telephone or electronic mail. There also be a pick up truck travel between both sites from times to times. These pick up truck carry documents and physical items to deliver between both sites. The samples of defective products are always delivered to the factory by these pick up trucks. So far it was found that there is no fixed schedule for these trucks to travel between Bangkok office and factory. The Human Resource department who manages this transportation will normally find the truck arrangement on a case by case basis. Normally it is found that the truck travels to Bangkok office for at least once every two weeks.

4.3.3 Detail complaint investigation

During this process, the product specialist, in conjunction with the production engineer, will start investigate using all information they got from the preliminary investigation done by technical marketing engineers. If the information complete right at the first time, they can justify complaint right away. In most cases, they need to check for further detail such as production record. Sometimes when they study through the available information, the information may lead to more specific questions which could identify the liability of defective product. Then they would need more specific information from the customer such as the environment, the characteristics of customer's machine, the mean of transportation etc. In such case, the product specialist will contact the technical marketing engineer to ask for more information. Technical marketing engineer may have information available or may recheck to the customer. In the extreme case, the second visit to the customer site to conduct further investigation could happen.

Once the Product specialist and production engineer have adequate information ready for making decision, they will make the justification for the complaint whether or not the company will accept the liability of this complaint.

4.3.4 Determination of Corrective Action

After the product specialist and the production engineer found that the company owns the liability of the complaint, the production engineer will study further, base on the available information, in order to identify the cause of the defect. When the cause of defect is identified, the production engineer will determine the corrective action in order to prevent the recurrence of the problem. Once the corrective action is set, the production engineer will record the complaint justification along with the corrective action in to the complaint document and send the complaint document for further manager approval.

4.3.5 Sign off by manager

The production manager will recheck the complaint investigation and the corrective action to ensure there is no mistake. They may return to the engineer for further clarification of what the engineers have done and commented. The complaint investigation result and the corrective action may be revised if any mistake was found.

All the information will be considered and approve again by the manufacturing manager. Once the complaint investigation is approved, the investigation document will be replied to the technical marketing engineers. Then the technical marketing engineers will advise to the sale representative or the customer regarding the result of the investigation.

4.3.6 Claim settlement and credit note issuance

The sales engineer, once received the complaint justification from technical marketing engineer, will return to customer and arrange the claim settlement. The credit note will be issued in order to compensate the loss of defective product for customer. The credit note issuance will be recorded for summary the total claim in bath and tons.

It should be noted that the claim settlement process is not part of the complaint management system. This process is controlled by Sales and Finance person. It involves many external factors such as negotiation and commercial settlement. This

process is not included in the study since it is not significantly relevant in the investigation process. However, the data is included in this stage only for information and determination of possible future improvement.

4.4 The Pareto's analysis of complaint process

When we consider the detail of overall investigation process, it is found that each activity takes time. Due to the fact that time to give the customer answer about the complaint investigation affect the customer level of satisfaction. The overall time for investigation process should be reduced. In order to reduce the overall process time, each activity is studied and analyzed to find better alternative. Then the average time usages of the activities are collected during the study period and are shown as following Pareto diagram.

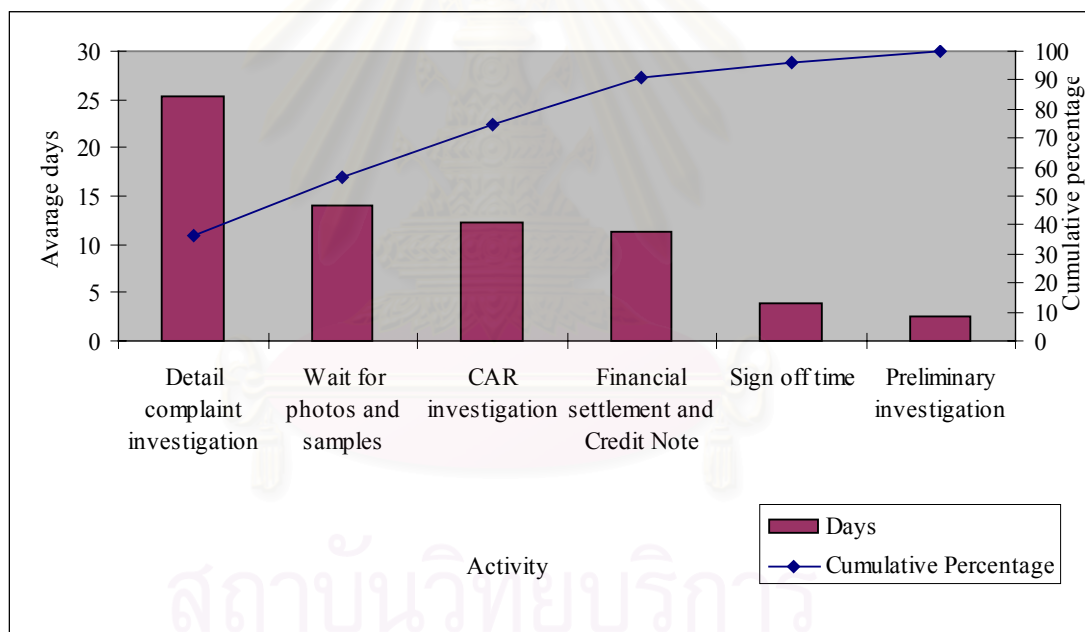


Figure 4.1 Pareto diagram for complaint activities

It is found that amongst every activities, the detail complaint investigation spend most time to finish. It takes averagely 25 days to finish the process. The time spent for waiting for photos and samples and CAR investigation also significantly high. First three items account around eighty percent of time spent in the overall process. Then we should focus to improve these activities due to the fact that they

spend the majority of time in the process. Reducing time used in these activities will significantly improve the overall process time of complaint investigation.

4.5 Cause and effect analysis of complaint activity delay time

The following analysis will be using the cause and effect diagram to find the problems which creates delay to the process. The top three items are selected to analyze and solve since they account for the majority of time spending in the process.

4.5.1 The delay time from detail investigation activity

The detail investigation activity spends 25 days an average to complete. It accounts the highest time usage in the process. We start to analyze this item first to see the cause of the problem using cause and effect diagram.

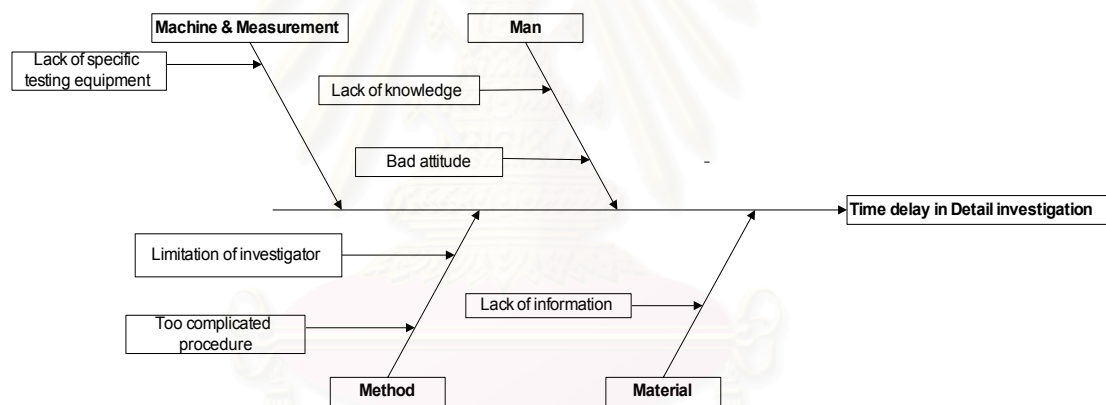


Figure 4.2 Cause and effect diagram for detail investigation process

Man

The detail investigation is carried out by the production engineer. There are two possibly causes related to people factors

1. Lack of knowledge

The production engineer sometimes finds the defect that happens for the first time of his experience. They are lack of understanding what the defect is. So they have to study and analyze the defect, which results in delay to make decision.

2. Bad attitude

The production engineer always focuses on the production output. Sometimes they are not customer oriented mind. This results in delay in the investigation process where the engineers always put them less priority.

Machine and measurement

The factor from machine and measurement is the lack of specific testing machines. Sometimes the defects need to be tested and evaluated by the specific machine such as Scanning Electron Microscope (SEM) to find the surface contamination. When defects occur, ie corrosion, there were not testing machine available at the site. One of the options is to send samples to the company's head research laboratory in Australia which spend long time to finish.

Method

The method of detail investigation may cause the delay time in the process. Two major causes are discussed here

1. Limitation of investigators

The existing procedure assigns the production engineer to investigate the complaint. There is no alternative for assign the other to investigate. So when the production engineer is not available or engaged to the other job, the only outcome is to wait for him to be available for investigate.

2. Too complicated procedure

The procedure involves many departments and employees. It may not be necessary to pass the process to some particular employee that does not add significant benefit to the process, but the delay of the process.

4.5.2 The delay time from delivery samples and photos

The second largest causes of time spending process is the waiting period for delivery of photos and samples. As previously discussed the photos and samples are very important to the complaint investigation due to they contain a lot of information necessary to understand the defect and making justification. The detail investigation can not start if the production engineers still have not got the photos and samples.

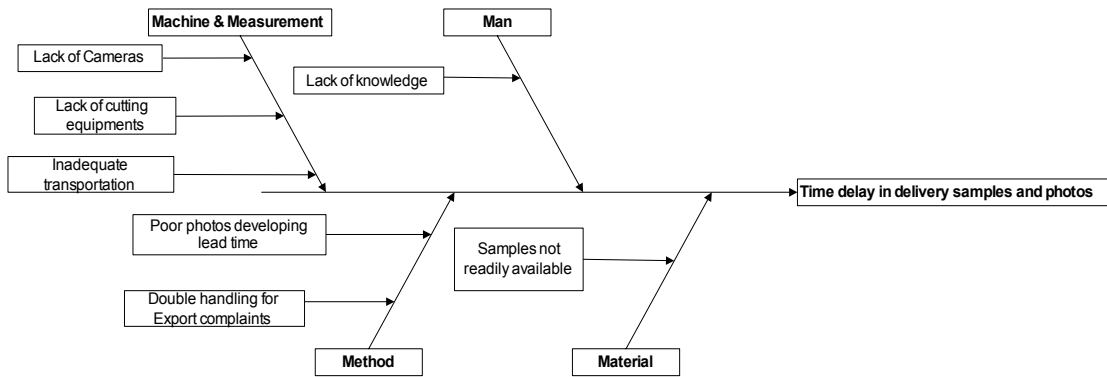


Figure 4.3 Cause and effect diagram for delivery samples and photos process

Man

The preliminary investigation is done by the technical marketing engineer. So the samples and photos will be taken by him, normally during the customer visit for complaint. The possibly causes of delay due to taking samples and photos are lack of knowledge. He may not be adequately trained to understand what information is required for detail complaint investigation. The samples and photos, which were taken, may not exhibit the clear defect, which make difficulties to the production engineers to make decision. So, as a result, new samples and photos may be required.

Machine & Measurement

The delay in delivery photos and samples process may be caused by three following situations

1. Lack of cameras

The technical marketing engineers may find that sometimes the cameras or films in the office are out of order. So it is unable to have any photos back from the investigation at customer's site. So they may ask for the photos from the customer, if possible, or revisit for taking photos.

2. Lack of cutting tools

Flat steel product can be cut by using the appropriate cutting tools. The best way to cut the metal sheet is to use the machine, which is normally available at the customer site. The alternative is to use the metal sheet cutting scissor. Anyway there are limitations where the hand forced scissor cannot cut the thick steel sheet. Then we have to ask customer to help cut them, which sometimes he have to wait for the

machine availability. Once the samples are ready, they may deliver them to us or ask us to revisit.

3. Inadequate transportation

There are pick up trucks that travel between the marketing office and the factory, arranged by the HR& administration department. They are the only mean of transportation the samples back to the factory for detail investigation. So far the trucks travel without fixed schedule. They will only travel to marketing office when there are significant documents or items to deliver between offices. Anyway, it is found that normally they travel at least once every week. But in the extreme case, they travel only once during two weeks, which do not happen frequently.

Method

The method of taking photos could be one of the causes for delaying. There are two normal cameras (i.e. Nikon, Canon) in the office. These cameras use the negative film for recording photos. It is normally found that when the photos are taken for each individual complaint, the film may still unfinished. It is normally require 36 photos to finish the whole roll of film. Once the film is still not finished, the photos still cannot be developed. So it is normally delaying for one or two days to finish the film and spending sometimes to develop the film to the printed paper. Then the printed papers can be delivered by internal mail system to the production engineer, or in the urgent case, it can be scanned into computer file and send by email.

The export complaints are considered as the double handling. When the complaint is registered with the technical marketing engineer, the technical marketing engineer will find the relevant information to provide to the production engineer. In case of export complaint, it is unlikely the customer will be visited at site. The samples and photos are normally delivered by courier. Then all the samples and photos will be delivered to factory later on. So this is considered the double handlings.

Material and Environment

Sometime the sample is not readily available during the technical marketing engineer visit the customer to investigate complaint. This is due to the following reason

1. The customer does not prepare the sample because he does not know the sample is required. This is because of the visitors did not inform the customer in advance regarding the requirement of samples. The sample may be prepared later by the customer after the visit.
2. The samples cannot be taken. In some case the sample cannot be taken due to the fact that the sample may have been use into the critical parts, such as roofing sheet. So if the sample is taken, it may create consequence damage to the machine or parts at the customer's site. Then the samples may be not available, or can be provided later after there is a sound solution to ensure there will be no consequence damage.

4.5.3 The delay time from Corrective Action Request (CAR) investigation

According to the previous procedure, the CAR is included in the complaint investigation process. The CAR investigation is accounting the third time consuming activity. This should be eliminated starting with the analysis by following cause and effect diagram

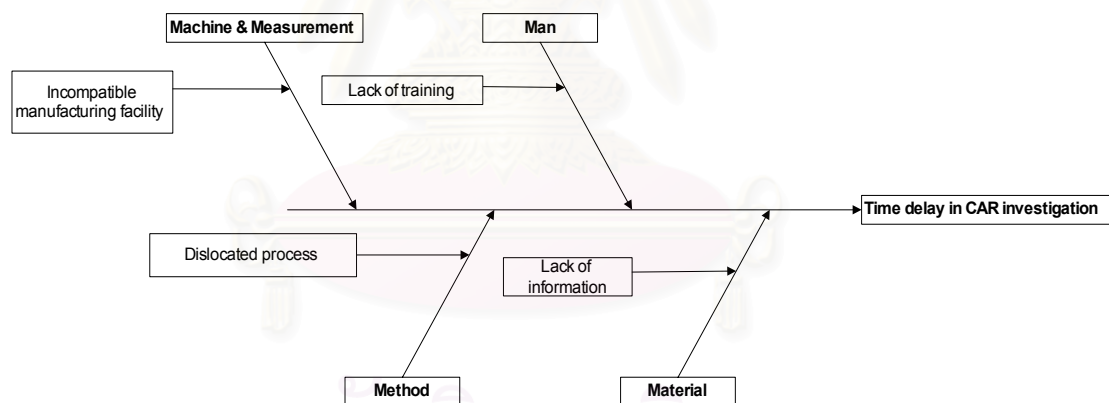


Figure 4.4 Cause and effect diagram for CAR investigation process

Man

The corrective action is developed by production engineer. It is possible that the engineer may be lack of understanding process. So it is hard to identify the root cause of the defect and identify the corrective action. So he may spend more time to study from related sources in order to develop the effective corrective action.

Machine

This normally occurs with the newly developed product. The current facility may not be suit with the production of the particular product. So the production engineer will find it is difficult to develop the corrective action under the limited number of solution. This may involves the installation of new facility or control to the process. The development of these corrective actions will add extra time to the process.

Method

The method of having CAR system within the complaint investigation system may not be appropriate. The CAR system itself does not add any benefit to the investigation in term of replying the complaint justification to the customer. On the other hand, it adds extra time in the process. Where the main focus is to reduce the process time of replying to the customer, adding extra time is not making any benefit.

Material

The production engineer may find the information regarding the production parameter which creates the defect is not readily available. Sometimes they will need to track though the production record at the shop floor level to find the related information. So this matter also causing delay to develop corrective action.

After we have analyzed the cause of delaying in the process, the proposed solution and system will be discussed in Chapter 5.

4.6 Recurrence of Defects

During the study period, it is also found that there are defects that repeatedly occur. There were thirty types of defects occur with the products. Twenty of them occur only once during the study period. The balance are found repeatedly occur between two to six times.

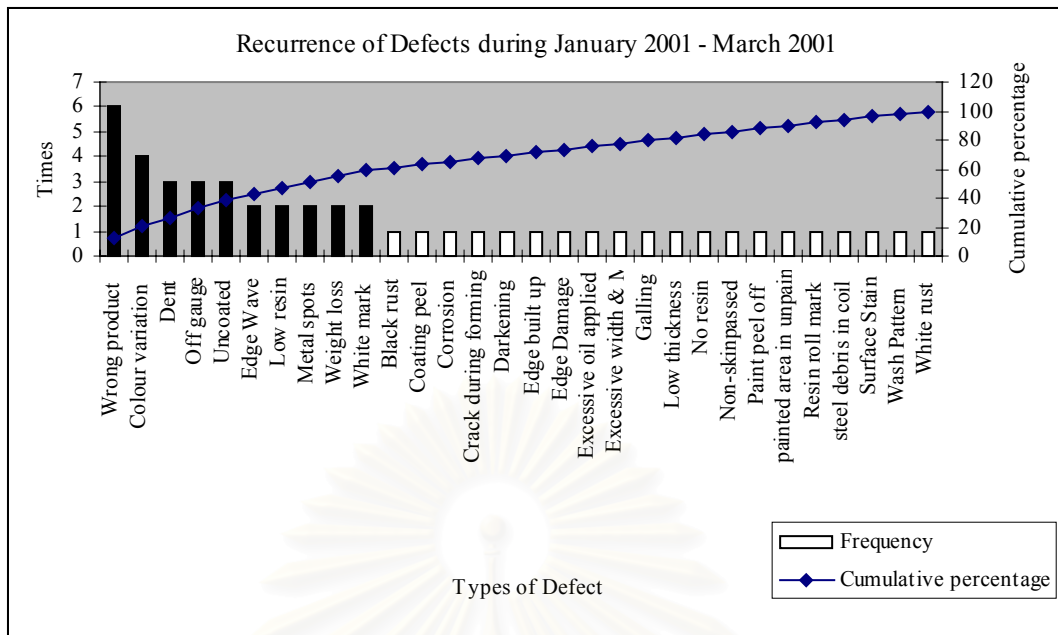


Figure 4.5 Pareto analysis of Recurrence of Defects

In order to improve the quality of the product, the production team should be aware of the existing causes that create the defects. In the complaint investigation process, the Corrective action request (CAR) system has been included. The intention of having the CAR system is to prevent the recurrence defects.

From the previous complaint resolution procedure, it is found that the CAR system had been included in the complaint investigation process. Meanwhile the recurrence of defects still exists. This is because of the following reasons

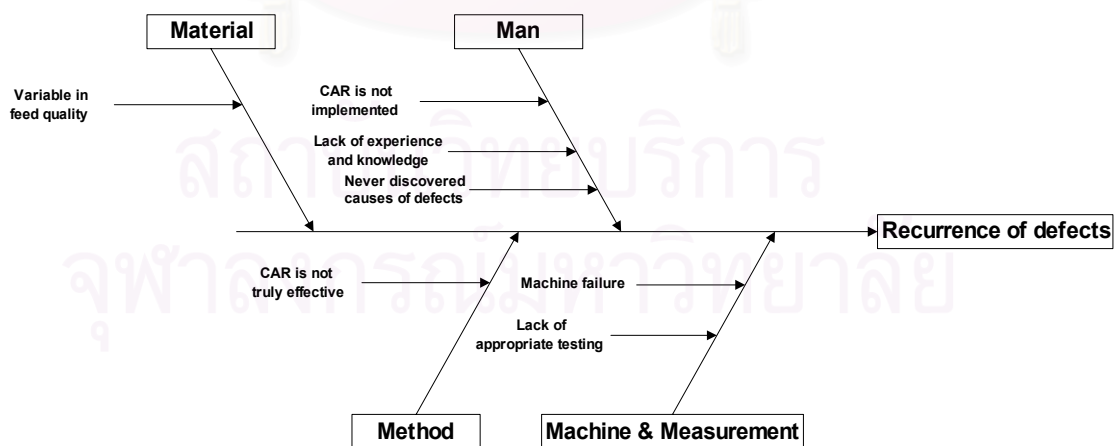


Figure 4.6 Cause and effect diagram for Recurrence of defects

In summary, the causes of having recurrence defects are;

Man

1. The CAR system in the complaint investigation process is the written memo. There is no specific system for approval and follow up. When the CAR is issued in the complaint document, it is hard to find whether the recommended solution is actually implemented. There is no tangible procedure to implement the corrective action. So it is possible that the Corrective action is not actually done.

2. The CAR is not properly recorded. So it is hard to gather all the studied information that the engineers have done for the future reference, when the defects occurs again. When the time passes, engineers may not recognize the work that was studied before, so they do not have knowledge to prevent the defects.

3. The cause of defect may have not been discovered before. Since the engineers never have records of corrective action, he will never know if it is the first time or the repetition. So the knowledge of his findings will never been recorded for future uses.

Material

The material, such as hot rolled steel, is supplied under the certain standard of specification. It is found that within the identical quoted standard, there are differences in the detail of product between suppliers. These differences may potentially induce the occurrence of defects. The proper study and record of these causes should be recorded to prevent the potential problem.

Method

When the CAR system is included in the complaint investigation system, the main focus of the engineers is to investigate complaints and find the complaint justifications. There is also the constraint that the time is the key focus of the complaint investigation process. The CAR is not carefully determined and implemented.

Machine

The similar defects may be caused by the varieties of machine functions breakdown. It might be the new part that contributes to the similar defects. The testing and evaluation in the process could be inappropriate to identify the problem, so the defect has not been detected.

In conclusion, once the causes of problems are identified, the analysis and proposal for solution will be discussed in the next chapter.



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CHAPTER 5

PROPOSED COMPLAINT MANAGEMENT SYSTEM

In this chapter there is the discussion about the proposed process for the complaint management system. As stated in chapter 1, the objectives of this study are

1. Development of a database system which will be analyzing and monitoring the causes and solutions of quality problems.
2. Reduction of complaint process time while the data and information are kept reliable.

In order to serve both objectives, the proposed system is discussed in this chapter.

5.1 Analysis of planning the solutions

After the causes of problems have been identified in Chapter 4, planning for the solution will be discussed here.

According to the findings in Chapter 4, the several brainstorming session were conducted between the teams. The session consisted of technical marketing engineer, technical marketing manager, production engineers, and manufacturing managers.

As previously discussed, the new complaint resolution system will manage all the complaints raised to the company. The main focus is to reduce the process time for replying the investigation result to the customer while maintain the correctness of information.

Using the 3M techniques, the further findings for planning the solutions are summarised as follows:

Table 5.1 Planning the solutions

Planning the Solutions					
Area of problems	Causes	Solutions	Requirement	Expected improvement	Expected target
Delay in detail investigation process	Investigator lacks of knowledge	Conduct product training	Set up training	More understanding of problems leads to faster process time	50% reduction of average process time
	Investigators have bad attitude	Conduct customer orientation training	Set up training	More effort to finish the process faster	
	Lacks of specific testing equipment	Conduct testing in SRL Australia	Contacts in SRL	Faster testing in SRL for extreme case	
	Limitation of investigators	Allow technical MKT to investigate complaint	Additional technical Mkt crews	Faster response to customer	
			Product & defect training		
Too complicated procedure	Simplify procedure by reduce non-value added activity	Design new process flow			
Delay in samples and photos delivery	Lack of information technical marketing lacks of knowledge	Conduct training to Technical MKT about information requirement	Set up product & defect training	Faster and more accurate samples, photos and data collection	50% reduction of average process time
	Lack of tools		Get the appropriate tools for the job		
	Inadequate transportation	Rearrange transportation	Request assistance from HR to set pick up travelling twice a week	Faster smaples delivery upto 50%	
	Photos development leadtime	Changes to use digital cameras	Get new digital cameras	Faster and more accurate samples, photos and data collection	
	Export complaint has double handling process	Reduce handling process by direct complaint to Production	Advise the export sale	Faster complaint process	
	Samples is not prepared/not avaiilable	arrange with customer before complaint visit	advise sales and technical marketing	Faster samples delivery	
Planning the Solutions (cont)					

Area of problems	Causes	Solutions	Requirement	Expected improvement	Expected target
Delay in CAR investigation	Lack of training & knowledge	Conduct training	Set up training	Faster and more accuracy CAR investigation	100% removal of process time
		Create records for future reference	Set up the separated CAR system	Faster overall complaint process	
	incompatible facility	Study before accepting new product	Set up NSPE system	Potential risk is study and prevented, reduce to to develop CAR	
	dislocated of process	CAR is not required in complaint investigation system	Separated CAR system	Faster overall complaint process	
	Lack of information	CAR to be properly recorded for future reference	Separated CAR system	Faster overall complaint process	
Recurrence defect	CAR is not actually implemented	CAR to be follow up and audited	Separated CAR system	CAR is implemented to prevent recurrence of defects	Reduction of recurrence defect by 50% by the end of 2002
		Create database of CAR for recurrence defects for future reference	Create database	Reduction of recurrence defect for long term	
	Lack of experience and knowledge	Create database of recurrence defects' CAR for future reference	Create database		
	Undiscovered causes of defects	Create database of CAR for recurrence defects for future reference	Create database		
	Variable in the feed quality	Record of finding for future supplier selection	Create database that can be used to review and reference		
	CAR is not truly effective	Find alternative corrective action/record for reference	Create database that shows alternative solutions		
	machine failure	Record of finding for future prevention	Create database that can be used to review and reference		
	lack of appropriate testing	Conduct testing in SRL Australia	Contacts in SRL		

5.2 Design of a complaint management system

The following discussion will be about the design of the complaint management system.

Separation of CAR system

When consider the CAR system, It is important in terms of preventing or fixing the recurrence of defect. In fact it takes time to process, and once it is included in the complaint investigation system, it results in more time to response to customers.

The information in the CAR system does not required to be provided to customer. The customer main focus is to have the answer whether or not the company will accept claim. Generally the corrective action then can be considered as the internal information.

So we should exclude the CAR system from the complaint investigation system. The benefit of separating CAR system is discussed in the previous topic.

Increasing authorities for technical marketing engineer to justify claim

As discussed in the previous chapter, due to the fact that the marketing office and the factory are located more than 200 kilometres away from each other, there are limitation and difficulties in communication. The difficulties exist in various types

1. Difficulties to provide samples, photos and other information
2. Difficulties to search for the required information directly from customer by the production engineer.
3. Limitation to observe the process, product transportation and storage environment.
4. Limitation to resolve potential loss at customer site.

By considering the above difficulties, the alternative of process the complaint investigation is to transfer the investigation process to the contact point with customer. So the investigation should exist at the technical marketing team. This matter would help eliminating the difficulties as discussed above.

Where the specific knowledge or testing is required, the investigation may still be forwarded to the production engineer.

Recruiting more technical marketing engineer

As proposed in the new system, the detail investigation of complaint will be started at the technical marketing team. So the roles of the technical marketing team will be changed. Not only visiting the customers and gathering the information, the technical marketing engineer is required to investigate and analyze the defect. He also requires to search for the production record, if necessary, to find the relevant information which supports the decision making of justifying complaint.

So it is clearly seen the function of the technical marketing engineer is increased. Hence, prior to implement the new complaint resolution process, the company decided to recruit two more engineers to the technical marketing position, while there was only one engineer in the past.

All the three engineers are reporting to the Technical marketing manager.

Product knowledge training

All three technical marketing engineers are required to have the adequate product and defect knowledge in order to make justification of complaint. The mistake in justifying claims may cause company losing money and businesses, meantime it may also cause customer lack of confidence in the company. After the new recruitment, all of them are trained in the production line by the production engineer, regarding the defect and product. The training spends two weeks starting from the pickle line, Cold rolling mill, Metal coating line and paint line consequently.

Equipment

More types of equipment are required to ensure the information can be obtained adequately. New types of equipment like digital camera, cutting tools, paint test equipment and others chemicals are available after the problem is found. The digital camera provides the convenience over the normal cameras since the photos can be viewed and delivered instantly through the company's electronic mail system.

Customer orientation training

Some of the complaints may still require the production engineers' investigation and analysis. The production engineer should understand the customer's

requirement and also realise the importance of customer. So the training regarding market and customer requirement is conducted by Vice President Marketing for the production engineers and the logistic staff. The production engineers are also invited to join regular customer visit with sales people, so they can understand the nature of customer and their requirement.

Transportation arrangement

Even though the complaint investigations are divided and partially investigated by the technical marketing. The samples and photo are still required to send to the production engineer for record and CAR investigation.

In case of investigation by production engineers, the samples and photos must be delivered as soon as possible. The agreement has been made with the HR department to schedule the transportation between Marketing office and factory. This results in the transportation availability every Wednesday and Friday each week.

Development of non standard product enquiry (NSPE)

The non standard product enquiry system is created to serve the need of designing and improving new products. Non Standard Product Enquiry is defined as a customer request of product that is not previously produced in the production line or when the customer is need or when the product is listed as nonstandard in our market offer.

The assessment in the new product is done prior to order acceptance. So the Sales people, production engineer and technical marketing engineer are aware of the characters of the new product, along with potential risk of having complaints. This eliminates the lack of knowledge on the product when defects occur on those products.

The NSPE system is under responsible of business development manager which does not directly involve in the complaint management system.

Complaint investigation for Export complaints

The manufacturing manager suggests that the export complaint should be directed to production engineer in order to simplify the process and reduce the double process which does not add any benefit. The sample of export complaints can be sent

directly to the factory, while the information may come in mail, fax or email, which can be directed to the factory altogether. Anyhow, the information will be copied to technical marketing engineer to create the logs and update the complaints.

Organisation changes

The company decided to reorganise the technical department which used to be existing in the Production department. The intention is to eliminate the redundant work between Technical marketing team, Technical team and Production team. After the reorganization, there will be only Technical marketing team and Production team only.

This matter impacts the complaint resolution process and CAR system. The route of process flow will be direct between Technical marketing team and Production team.

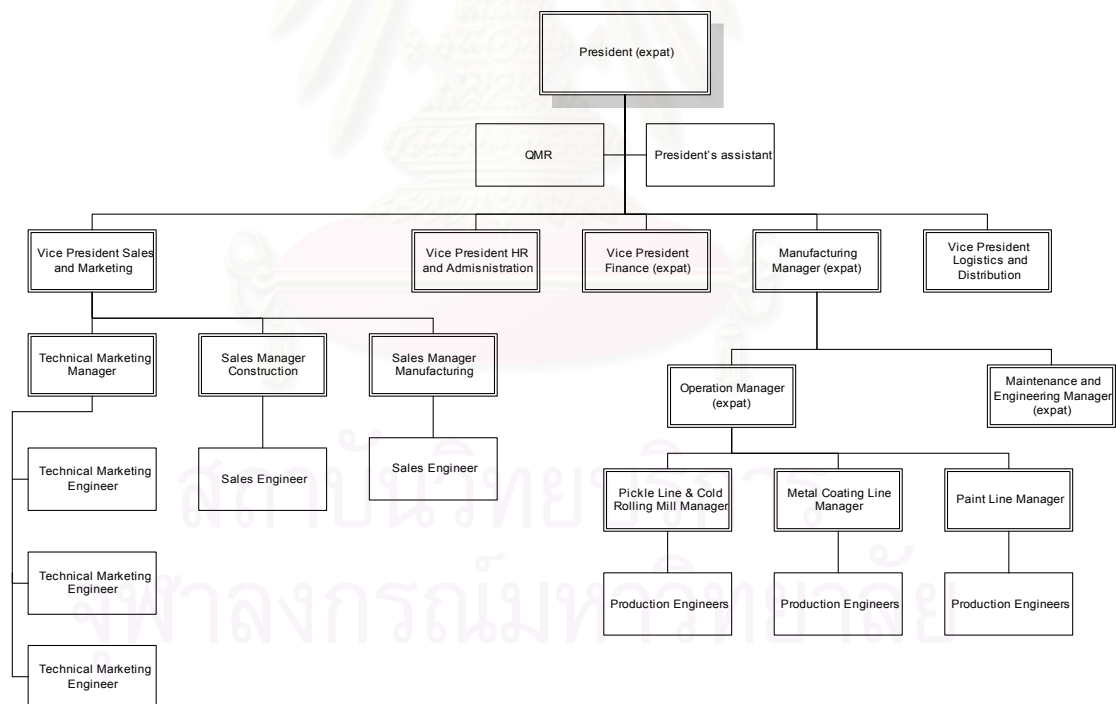


Figure 5.1 Company's new organisation

5.2.1 Design of a complaint resolution procedure

Proposed complaint investigation process

In detail, the following process is proposed

1. A customer complaint will be initiated by Technical marketing engineer, who collects details of the complaint includes samples and photos, registers complaint, and record complaint details for investigation.

2. Complaint details are to be recorded on Customer Complaint - Record Form and used to summarize findings of the investigation, with attachments as necessary. Complaint investigations are conducted by Technical Marketing, with assistance from productions, to assess whether the complaint is justified.?

Complaint investigation may include:

- a) Review of complaint details and inspection of defect photo's and/or samples.
- b) Review of production records data.
- c) Inspection and retesting of retain and/or defect samples.
- d) Review of complaint records, for similar complaints & past corrective actions.
- e) Site inspection, if necessary to collect additional data.

Details of site inspection to be recorded on Customer Complaint - Product Inspection Form

Investigation justification are prepared by Technical Marketing Engineer and approved by Technical Marketing Manager.

3. If Technical Marketing is unable to finalise the complaint investigation, they will request a plant investigation by the Plant Production group. In this case, investigation findings are prepared by Production Engineer and approved by the Manufacturing Manager, then returned to Technical marketing engineer.

4. Technical Marketing advises Sales Representative of the findings from the complaint investigation. Sales representative will advise the customer and process the commercial claim settlement. Sales Representative will file complaint documents and updates customer history records.

5. Technical Marketing (Bangkok Office) and Operations (Map ta phut Plant) both maintain a central record file for registered complaints.

Customer Complaint Flowchart

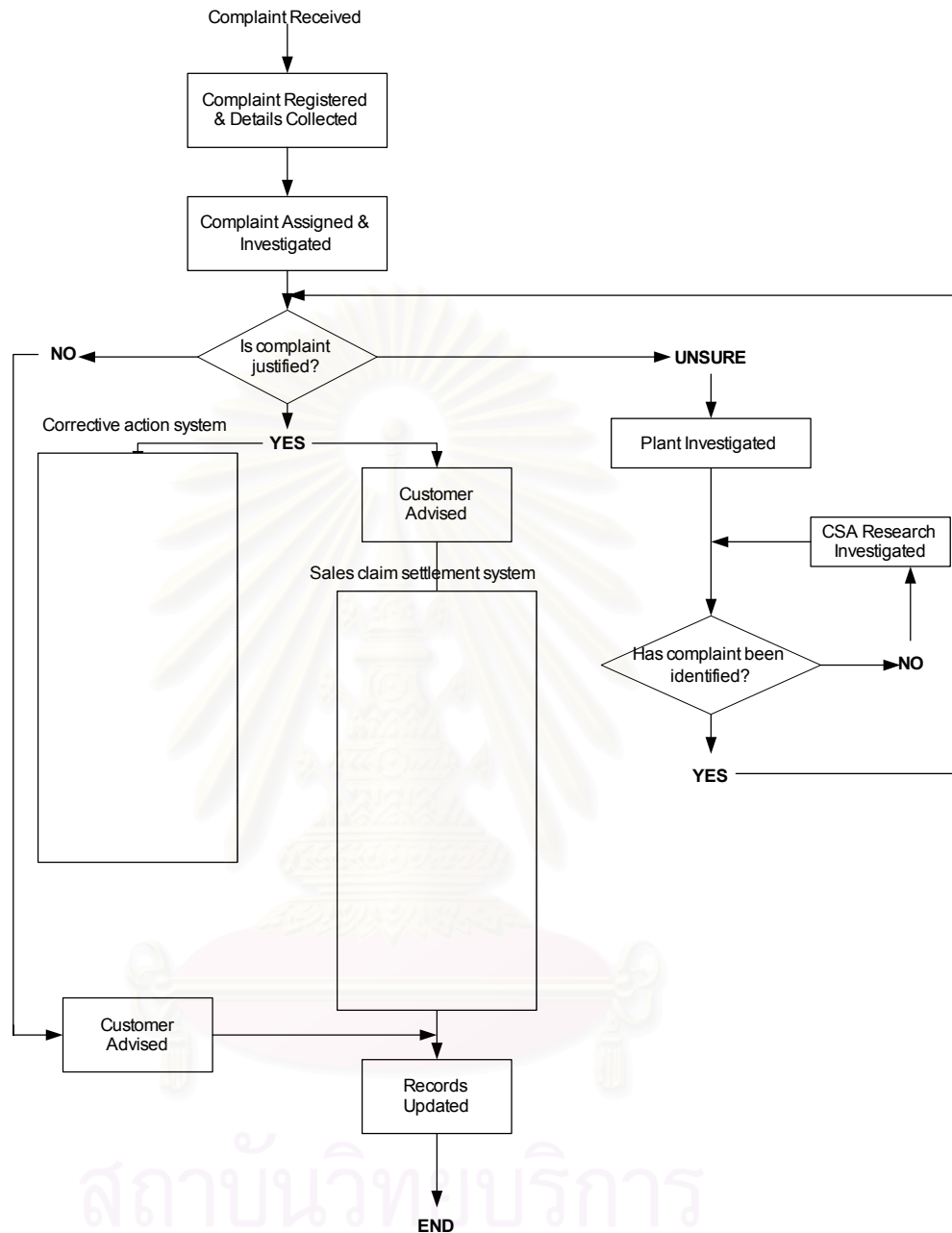


Figure 5.2 Proposed complaint resolution procedure

5.2.2 Design of a corrective action request (CAR) system

As discussed in the previous chapter regarding the situation of the current corrective action request system, the new system is proposed. The new system should solve the previous problem, so the following objectives should be focused

1. Reducing the time constraint created by the complaint investigation process requirement. This is to allow the CAR system to be appropriately

determined in detail. As the consequence, the CAR system should be allowed to spend considerably more time to complete.

2. Creating the tangible system, which can be audited and followed up.
3. The improvement should align with the business requirement ie implementation of ISO 9001.

When consider the above focus, the solution for the CAR system should be creating the standalone CAR system, which specifically define the process of issuing CAR and follow up CAR. The following process should be conducted.

1. The CAR System will be started after the complaint is accepted. When the complaint is not accepted, the CAR is not issued since there is nothing wrong with the product.
2. The CAR will be issued by Technical marketing engineer, directly to the production engineer at the relevant production line, ie the CAR regarding to the prepainted product will be issued to the Paint line.
3. The issuer of the CAR will raise the CAR form and record the CAR form with the assigned CAR number and reference complaint number.
4. The receiver of the CAR will record as the CAR is received. Then after the corrective action is investigated, the investigation result is recorded in the file with the due date for implementation and return to the issuer.
5. The issuer will determine whether the corrective action is appropriate then the CAR form can be signed off.
6. The issuer will follow up the corrective action after the proposed due date by checking whether the corrective action have been actually implemented and determine the result of corrective action by measuring the recurrence of the defects.

The following figure (Figure 5.3) is the CAR system explained in the flow chart.

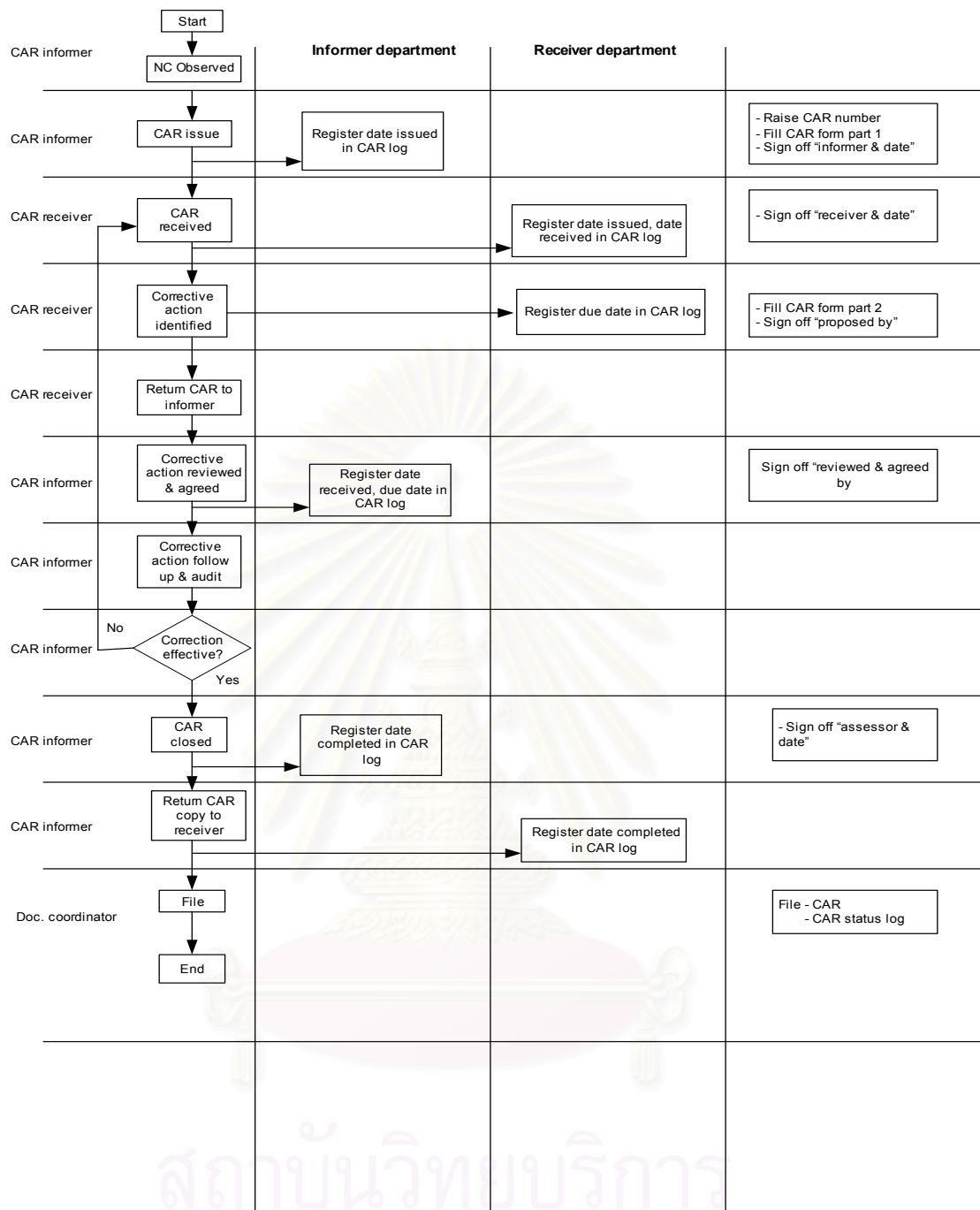


Figure 5.3 CAR system flow chart

5.2.3 The implementation of the new complaint management system

The proposed system is fully implemented in January 2002. There are activities taken to ensure the success of the implementation.

1. Review proposed system and sign off by management (Manufacturing manager)
2. Related staffs join the meeting to agree on the new improvement.

3. Implement new system
4. Review the result
5. Identify the problem of using new process, if adjustment are needed
6. Update the process from time to time

5.3 Development of a corrective action for recurrence defects database

During the implementation, it is found that there are recurrences of defects which continuously happen since the study period. In fact the corrective action system should help eliminates the cause of defects. But the recurrence of defects still remains. So the need for database still exists. During the implementation period, the complaint data is summarised to find the situation of recurrence of defects.

Table 5.2 Complaint data of January 2002 - March 2002

Number	Complaint No	Category	Defect	Quality Tonne involved	Input Date	Total Paid Value (Bht)
1	02C001	Domestic	Prescratch	5.686	04-Jan-02	9097
2	02C005	Domestic	Wrong coil	3.355	08-Jan-02	4193
3	02C006	Domestic	Roll forming mark	3.2	08-Jan-02	0
4	02C007	Export	Paint peel off	34	10-Jan-02	0
5	02C008	Domestic	Uncoated	4.478	10-Jan-02	98418
6	02C009	Domestic	Resin stain	0.21	10-Jan-02	5802
7	02C010	Domestic	Undermass coil	2.57	16-Jan-02	2300
8	02C011	Domestic	Wrong coil	2.911	16-Jan-02	78527
9	02C012	Domestic	White Rust	6.022	16-Jan-02	0
10	02C013	Domestic	Darkening	5.568	16-Jan-02	5568
11	02C014	Domestic	Undermass coil	1.293	16-Jan-02	31445
12	02C016	Domestic	Darkening	4.56	18-Jan-02	8969
13	02C017	Domestic	Weight loss	2.887	18-Jan-02	50522
14	02C018	Domestic	Paint roll mark	20.868	18-Jan-02	0
15	02C019	Export	Uncoated	32.05	17-Jan-02	0
16	02C022	Domestic	Uncoated	7.658	23-Jan-02	0
17	02C023	Domestic	Uncoated	4.568	23-Jan-02	0

18	02C024	Domestic	Uncoated	13.014	23-Jan-02	23104
19	02C026	Domestic	Dent	4.004	23-Jan-02	108391
20	02C027	Domestic	Uncoated	3.92	23-Jan-02	7854
21	02C028	Domestic	Uncoated	2.038	29-Jan-02	53409
22	02C029	Domestic	Damaged coil	1.72	31-Jan-02	10750
23	02C034	Domestic	Colour variation	9.367	05-Feb-02	0
24	02C035	Domestic	Fail antistatic	9.367	05-Feb-02	0
25	02C036	Domestic	Undermass coil	2.987	06-Feb-02	59296
26	02C037	Domestic	Wrong thickness	6.4	05-Feb-02	0
27	02C038	Domestic	Track off	0.81	06-Feb-02	4860
28	02C039	Domestic	Uncoated	2.181	06-Feb-02	116365
29	02C040	Domestic	Wave	2.806	11-Feb-02	14384
30	02C043	Domestic	No resin	3.3	14-Feb-02	0
31	02C044	Domestic	Dent	0.01	14-Feb-02	3402
32	02C045	Domestic	Dent	43.354	15-Feb-02	49266
33	02C046	Domestic	Wrong coil	9.261	18-Feb-02	347227
34	02C047	Export	Wave	12.395	20-Feb-02	0
35	02C048	Export	Wave	32.722	20-Feb-02	0
36	02C049	Domestic	Wrong coil	3.838	21-Feb-02	73919
37	02C050	Domestic	Wrong coil	4.621	21-Feb-02	7002
38	02C051	Domestic	Wrong coil	4.17	21-Feb-02	115567
39	02C052	Domestic	Wrong coil	4.032	21-Feb-02	70560
40	02C053	Domestic	Black spot	3.703	22-Feb-02	0
41	02C054	Domestic	Weight loss	0.28	22-Feb-02	2240
42	02C056	Domestic	Bore collapse	2.84	25-Feb-02	80558
43	02C058	Domestic	White rust	0.745	01-Mar-02	0
44	02C059	Export	Wave	27.265	05-Mar-02	0
45	02C060	Export	Uncoated	41.46	05-Mar-02	0
46	02C061	Domestic	Hole in coil	0.03	06-Mar-02	0
47	02C062	Export	Paint peel off	7.534	06-Mar-02	42100
48	02C063	Export	Paint peel off	17.4	06-Mar-02	0
49	02C065	Domestic	Uncoated	7.952	13-Mar-02	424271
50	02C070	Domestic	Wrong coil	2.114	13-Mar-02	58980
51	02C071	Domestic	Dishing	9	13-Mar-02	0

52	02C072	Domestic	Damaged coil	0.8	13-Mar-02	0
53	02C073	Domestic	Wrong thickness	1.093	14-Mar-02	16395
54	02C074	Domestic	Split	1.4	21-Mar-02	0
55	02C078	Domestic	Dent	3.23	28-Mar-02	88050
Total				445.047		2072791

5.3.1 Defect recurrence analysis

The summary of the analysis of data can be shown as follows

Frequency aspect

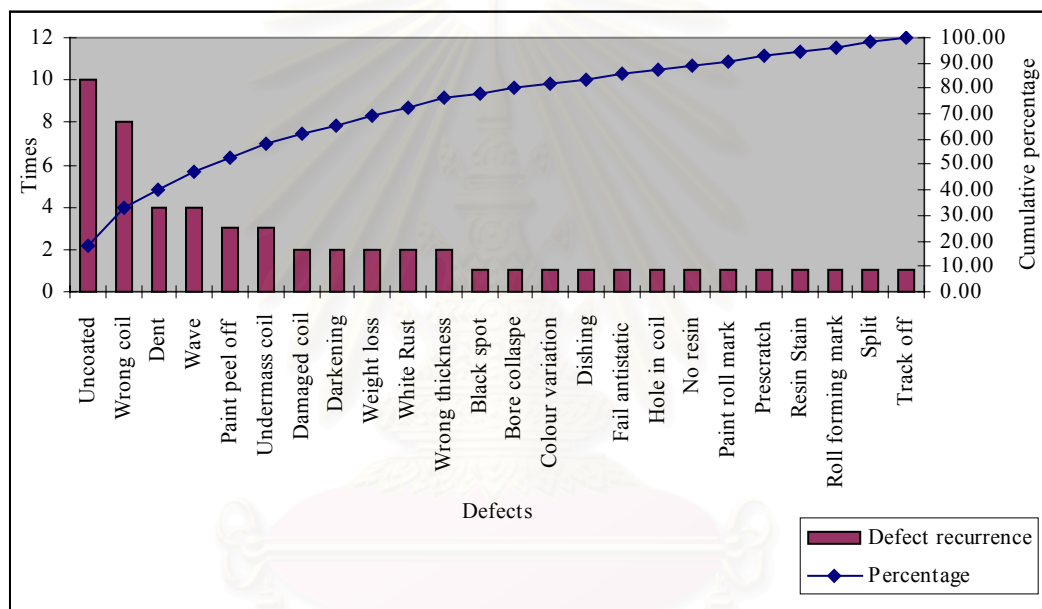


Figure 5.4 Pareto analysis of recurrence defects based on frequency (Jan02-Mar02)

The recurrence of defects are detected and sorted by time occurs. The recurrences of defects were found on the following defects;

1. Uncoated
2. Wrong coil
3. Dent
4. Wave
5. Paint peel off

6. Under mass coil
7. Damaged coil
8. Darkening
9. Weight loss
10. White rust
11. Wrong thickness

Volume Aspect

We may focus on these defects for further improvement. The further analysis is conducted base on the effects to business in terms of tonnage and financial settlement.

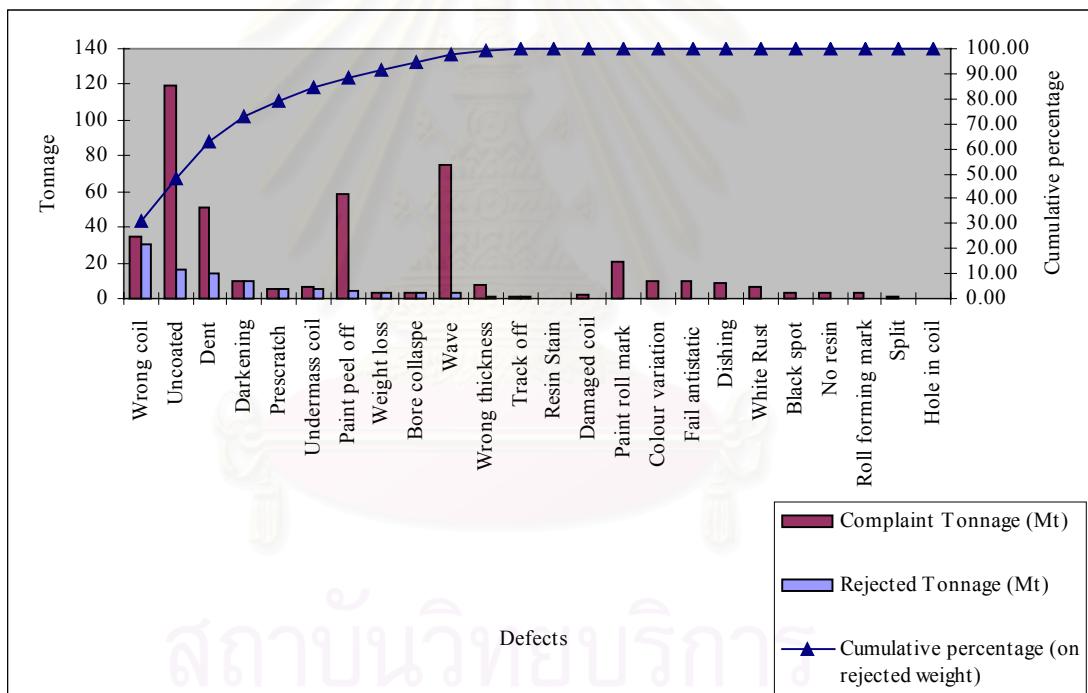


Figure 5.5 Pareto analysis of recurrence defects based on tonnage (Jan02-Mar02)

According to the analysis on the tonnage in complaint, there are two figures to be considered.

1. Complaint tonnage – refers to tonnage of complaint raised by customer
2. Rejected tonnage – refers to tonnage of complaint accepted as defective after investigation

In this figure, the rejected tonnage is used for sorting the effect of recurrence defects because it provides better accuracy than using complaint tonnage. There are four defects that are rejected more than five tons of product.

1. Wrong coil
2. Uncoated
3. Dent
4. Darkening

Financial aspect

The analysis in financial settlement provides the understanding of direct impact to the business as a result of complaints. The figure shows that there are three defects account for more than three hundred thousands baht which refers to more than eighty percent on total financial settlement claim. Those defects are

1. Wrong coil
2. Uncoated
3. Dent

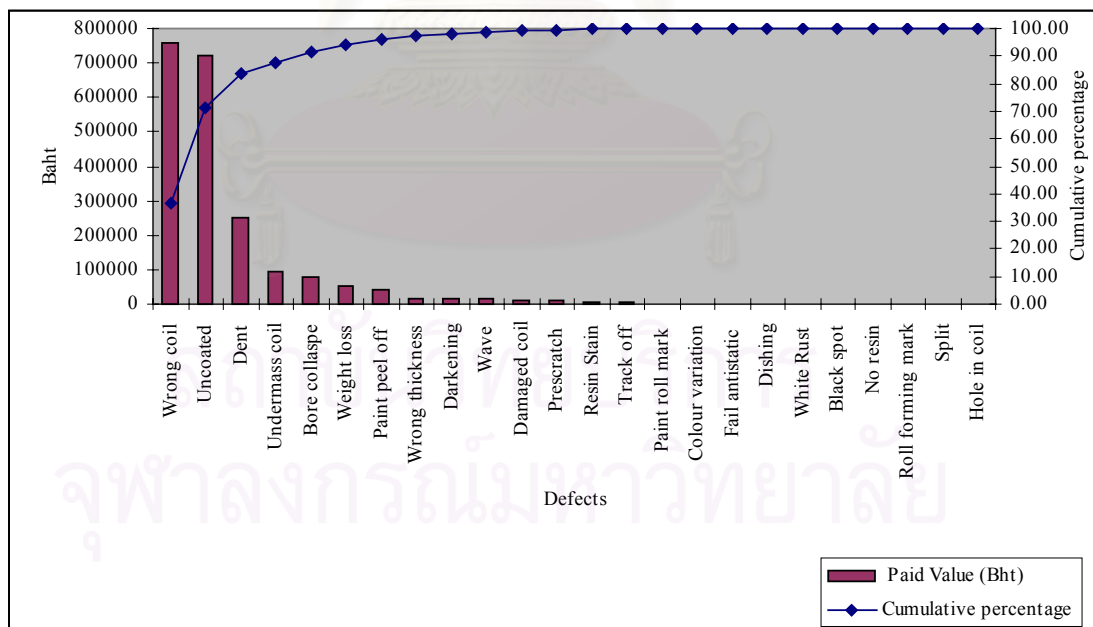


Figure 5.6 Pareto analysis of recurrence defects based on Financial claims (Jan02-Mar02)

According to the above analysis, it is found that even though the “white rust” defect occur repeatedly, it does not affect the financial settlement claim because the complaints are not justified. It also means that the corrective action has not been required.

Hence it is better to consider the development of database for ten defects captured from the above analysis which are;

1. Uncoated
2. Wrong coil
3. Dent
4. Wave
5. Paint peel off
6. Under mass coil
7. Damaged coil
8. Darkening
9. Weight loss
10. Wrong thickness

5.3.2 Development of database system

The following is the discussion regarding the development of database system. It includes the design of system structure, using data flow diagram, and design of records.

Design of the data flow diagram (DFD)

After the need of having database has been identified, the system structure of the corrective action database can be shown using the data flow diagram method. The data flow diagram will be showing the overall structure of the complaint management system.

There are four types of symbols used in the data flow diagram, as discussed in Chapter 2, which are entity, Information flow, Process and File.

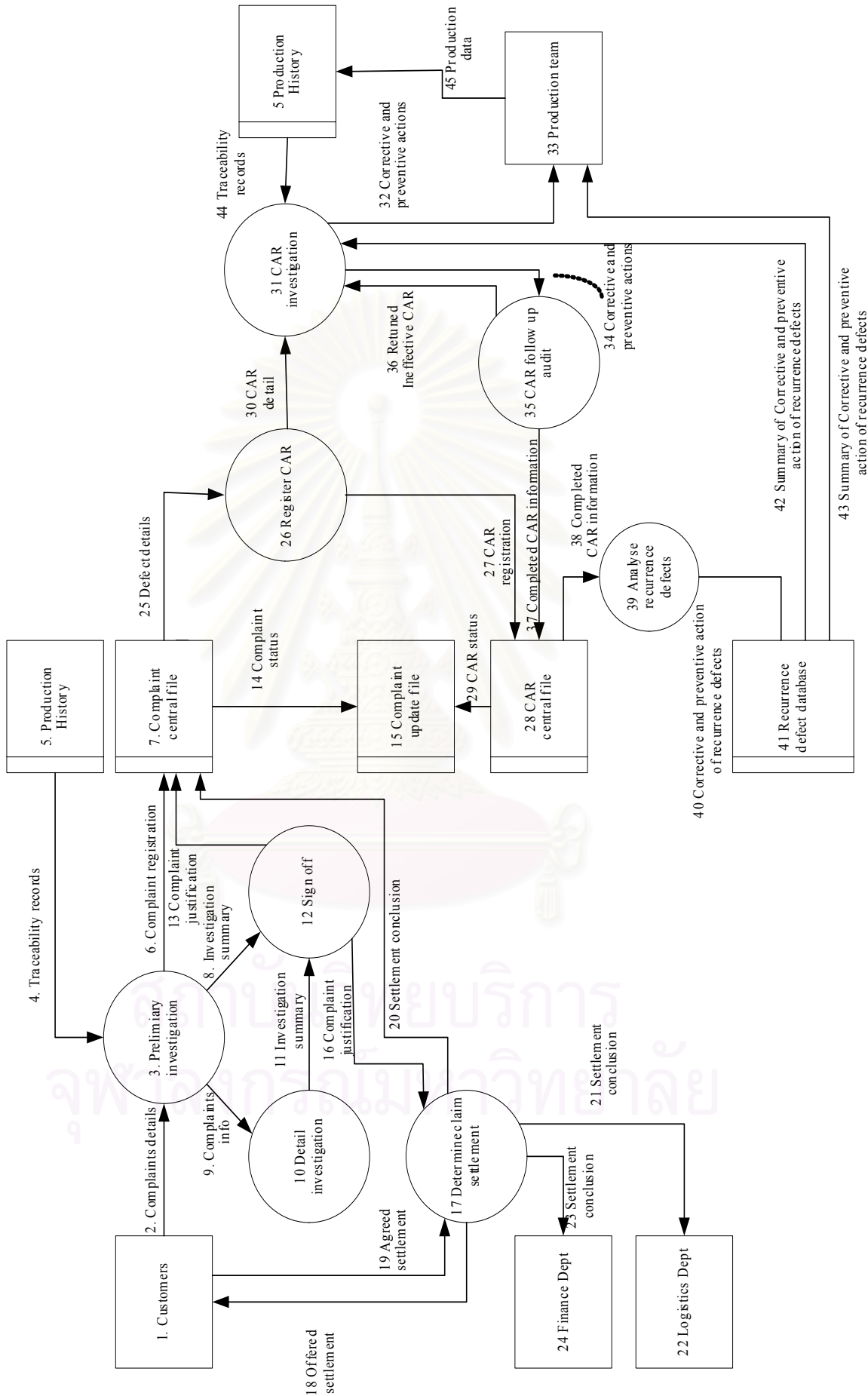


Figure 5.7 Data flow diagram of Complaint management system

According to the data flow diagram, The summary of overall complaint management process is as following;

Table 5.3 Overall data flow summaries of complaint management system

Item	Name	Type
1	Customers	Entity
2	Complaint details	Data flow
3	Preliminary investigation	Process
4	Traceability records	Data flow
5	Production history	File
6	Complaint registration	Data flow
7	Complaint Central file	File
8	Investigation summary	Data flow
9	Complaints information	Data flow
10	Detail investigation	Process
11	Investigation summary	Data flow
12	Sign off	Process
13	Complaint justification	Data flow
14	Complaint status	Data flow
15	Complaint update file	File
16	Complaint justification	Data flow
17	Determine claim settlement	Process
18	Offered settlement	Data flow
19	Agreed settlement	Data flow
20	Settlement conclusion	Data flow
21	Settlement conclusion	Data flow
22	Logistics department	Entity
23	Settlement conclusion	Data flow
24	Finance department	Entity
25	Defect details	Data flow
26	Register CAR	Process
27	CAR registration	Data flow
28	CAR Central file	File
29	CAR status	Data flow
30	CAR detail	Data flow
31	CAR investigation	Process
32	Corrective and preventive actions	Data flow
33	Production team	Entity
34	Corrective and preventive actions	Data flow
35	CAR follow up audit	Process
36	Returned ineffective CAR	Data flow
37	Corrective and preventive findings	Data flow
38	Completed CAR information	Data flow
39	Analyse recurrence defects	Process
40	Corrective and preventive action of recurrence defects	Data flow
41	Corrective and preventive action for recurrence defect database	File
42	Summary of corrective action of recurrence defects	Data flow
43	Summary of corrective action of recurrence defects	Data flow
44	Traceability records	Data flow
45	Production data	Data flow

Entity

The entity is the external party that originates input or receives output. In the complaint management system, there are four entities.

Table 5.4 Entities in complaint management system

Item	Entity name
1	Customers
22	Logistics department
24	Finance department
33	Production team

Process

The process shown in the data flow diagram is the process that transforms inputs into outputs.

Table 5.5 Processes in complaint management system

Item	Process name	Performed by
3	Preliminary investigation	Technical Mkt
10	Detail investigation	Production engineer
12	Sign off	Technical Mkt Mgr
17	Determine claim settlement	Sales
26	Register CAR	Technical Mkt
31	CAR investigation	Production engineer
35	CAR follow up audit	Technical Mkt
39	Analyse recurrence defects	Technical Mkt

Detail of each process is explained during the design of the complaint resolution procedure and CAR procedure.

Data flow

The data flow represents the transfers of data among entities, processes and stores. The followings are the summaries of all data flow in the complaint management system. The source and destination, including the types of data, are also shown as well.

Table 5.6 Data flow in complaint management system

Item	Data flow name	From	To	Required data
2	Complaint details	Customer	Technical Mkt	Product identity
				Defect details
				Customer identity
				Customer claims requirement
4	Traceability records	Production History file	Technical Mkt	Product identity
				Production records
				Product testing records
6	Complaint registration	Technical Mkt	Complaint central file	Product identity
				Defect details
				Customer identity
				Preliminary Investigation findings & comment
8	Investigation summary	Technical Mkt	Technical Mkt Manager	Product identity
				Preliminary Investigation findings & comment
				Defect details
				Customer identity
9	Complaints information	Technical Mkt	Production Engineer	Product identity
				Defect details
				Customer identity
				Preliminary Investigation findings & comment
11	Investigation summary	Production engineer	Technical Mkt Manager	Complaint justification
13	Complaint justification	Technical Mkt manager	Complaint central file	Complaint justification & approval
14	Complaint status	Complaint central file	Complaint update file	Complaint status update
16	Complaint justification	Technical Mkt manager	Sales	Complaint justification & approval
				Product identity
				Customer identity
18	Offered settlement	Sales	Customer	Offered claim settlement
19	Agreed settlement	Customer	Sales	Claim settlement agreement
20	Settlement conclusion	Sales	Complaint central file	Settlement conclusion
21	Settlement conclusion	Sales	Logistics	Settlement conclusion for returning product
				Product identity
				Return tonnage
23	Settlement conclusion	Sales	Finance	Settlement conclusion for Credit note issues
				Product identity
				Return tonnage
				Financial claim
25	Defect details	Complaint central file	Technical Mkt	Detail of defects
				Product identity
27	CAR registration	Technical Mkt	CAR central file	Detail of defects
				Product identity
29	CAR status	CAR central file	Complaint update file	CAR status update
30	CAR detail	Technical Mkt	Production Engineer	Detail of defects
				Product identity

32	Corrective and preventive actions	Production engineer	Production team	Proposed Corrective and Preventive actions
				Due date
				responsible person
34	Corrective and preventive actions	Production engineer	Technical Mkt	Proposed Corrective and Preventive actions
				Due date
				responsible person
36	Returned ineffective CAR	Technical Mkt	Production Engineer	Unsatisfied CAR
37	Completed CAR information	Technical Mkt	CAR central file	Corrective and preventive action findings
38	Completed CAR information	CAR central file	Technical Mkt	Corrective and preventive action findings
40	Corrective and preventive action of recurrence defects	Technical Mkt	Corrective and preventive for recurrence defect database	Corrective and preventive action findings
				Root cause analysis
				Frequency
42	Summary of corrective action of recurrence defects	Corrective and preventive for recurrence defect database	Production Engineer	Defect
				Originator / prepared by
				Original date
				Revision date
				Factors of problems (5M + 1E)
				Symptoms
				Root cause
				Frequency
				Corrective and preventive action
				Responsible person
Reference CAR number				
43	Summary of corrective action of recurrence defects	Corrective and preventive for recurrence defect database	Production team	Defect
				Originator / prepared by
				Original date
				Revision date
				Factors of problems (5M + 1E)
				Symptoms
				Root cause
				Frequency
				Corrective and preventive action
				Responsible person
Reference CAR number				
44	Traceability records	Production history file	Production Engineer	Product identity
				Production records
				Product testing records
45	Production data	Production team	Production history file	Product identity
				Production records
				Product testing records
				Production comments

Data stores

The last type of symbols in the data flow diagram is data stores. It is used to store data between processes. Followings are the summaries of data stores.

Table 5.7 Data stores in complaint management system

Item	File name	Types	Storage location	Controlled by	Reference
5	Production history	File	Production shelf	Production	Appendix F
7	Complaint Central file	File & computer files	Server & Shelf	Technical Mkt	Appendix C
15	Complaint update file	computer files	Server	Technical Mkt	Appendix D
28	CAR Central file	File & computer files	Server & Shelf	Technical Mkt	Appendix E
41	Corrective and preventive action for recurrence defect database	computer files	Server	Technical Mkt	Appendix A

The database form design

After the recurrence defects are detected, each individual defect is recorded in to the database. The characteristics of database should be;

1. Available for updates
2. Accessible
3. Contain required information for production engineers

After the brainstorming session with the team, the information required in the database is identified. The following is the questions that the engineers and related staff would like to have answers from the database as their information.

Table 5.8 Field design for database

Questions	Field design
What is the defect?	Defect
Who is responsible for updating the database?	Originator / prepared by
When did the CAR for this defect start?	Original date
When did the last CAR for this defect?	Revision date
How many factors for the problems?	Factors of problems (5M + 1E)
What problems occur?	Symptoms
What is the root cause of problem?	Root cause
How many times the problem happens?	Frequency
What is the corrective and preventive action for this particular problem?	Corrective and preventive action
Who is responsible for that problem?	Responsible person
What is the related CAR number?	Reference CAR number

After consider the requirement of the users, The following is the designed database

Corrective and Preventive Action for defects recurrence database						
DEFECT		No		Recurrence of defect		1
Prepared by		Dechakom B.				
Original date						
Revision date						
Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man						
Machine						
Material						
Method						
Measurement						
Environment						

Figure 5.8 The designed database

The database of each defect will be analysed by using the reference from each CAR in conjunction with the cause and effect diagram.

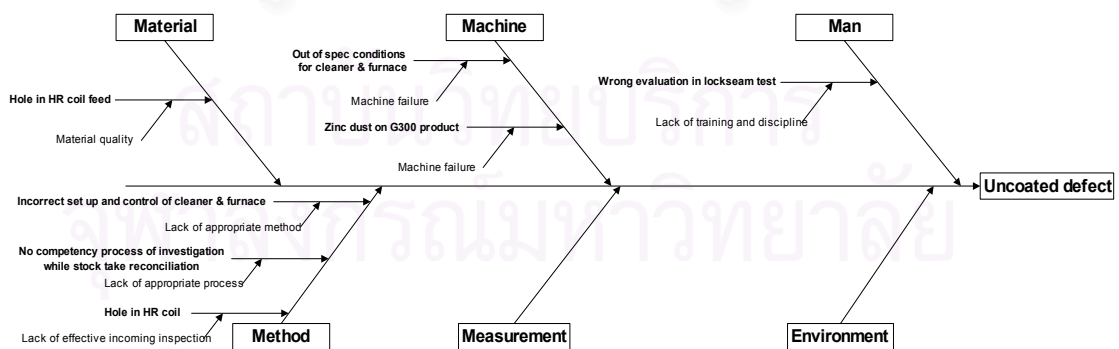


Figure 5.9 Cause and Effect diagram for uncoated defect

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

Uncoated
 Dechakom B.
 23/2/03
 1/8/2002

No
 Recurrence of defect

1
 10

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Wrong evaluation in lockseam test	Lack of training, Lack of discipline	3	Refresh training by lab tester for more concentrate on lab result and followed by SOP and technical standard	Suchat J	02C039,02C062,02C065
Machine	Out of spec conditions for cleaner & Furnace Uncoated from Zinc dust on G300 product	Machine failure	2	Return equipment to spec / regular check up	Saharat P.	02C008, 02C023
			2	HNX elards back to 100%, by pass manual and wait for spare part to fix	Kongkiat R	02C024, 02C027
				Insulated anout on top & Bottom	Kongkiat R	02C024, 02C027
Material	Hole in HR coil feed	Material Quality	1	Remove hole from prime coil	Exirt operator	02C027
Method	Incorrect set up and control of cleaner & Furnace No competency process of investigation while do stock take reconciliation	Lack of appropriate method	2	Establish standard and audit compliance	Saharat P.	02C008M, 02C023
			1	Recheck the right message until complete flow, hard copy from manufactring report	Chindara S	02C028
				The unknown coil (new coil) has no movement until finish invetigate and get right label	Songphon	02C028
Measurement						
Environment						

Figure 5.9 The Corrective and Preventive Action for uncoated defect recurrence database

The adjusted process flow chart of CAR system

Once the database is implemented, there is a minor adjustment in the process flow chart of the CAR system by including the update database into the process as shown in the following flow chart. So, each individual defect will be updated every time the defect recurs and CAR is finished.

The new recurrence defect will be analysed and added up every quarter, by tracking back for six months. So the next analysis will be at the end of June 2002, using data of January 2002 until June 2002.



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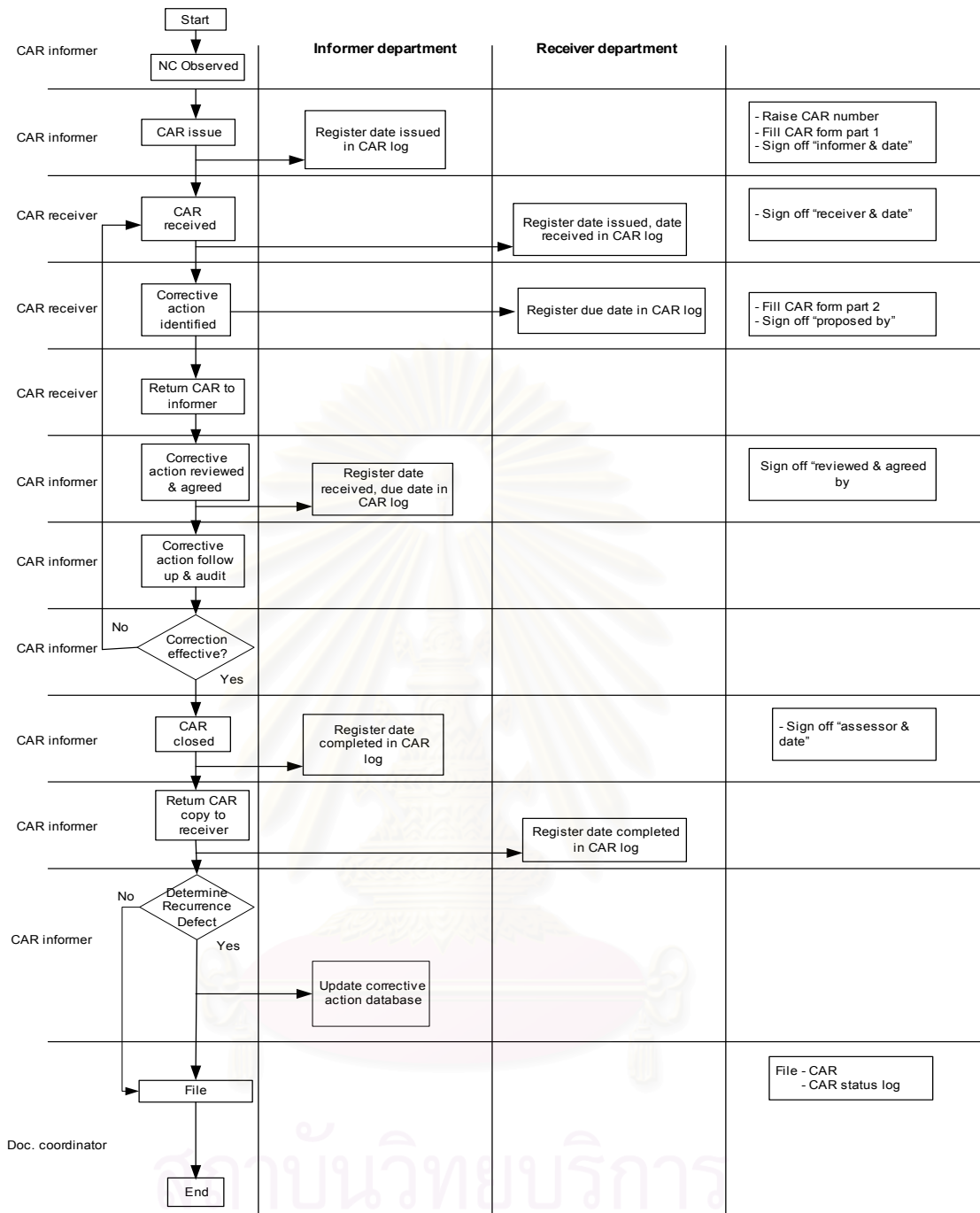


Figure 5.10 The adjusted CAR flow chart with link to database

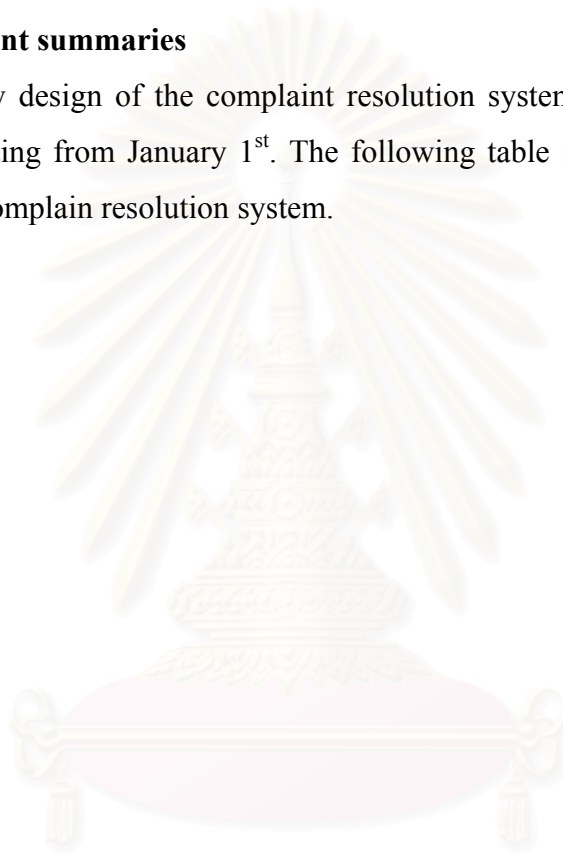
CHAPTER 6

RESULT AFTER IMPLEMENTATION

This chapter will be discussing the improvement activities and the result of the improvement. The data is collected after the implementation on January of 2002. The data covers the period of January 2002 to March 2002

6.1 Improvement summaries

The new design of the complaint resolution system is fully implemented in year 2002, starting from January 1st. The following table shows the action taken in designing the complain resolution system.



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Table 6.1 Improvement summaries

Improvement summaries				
Area of improvements	Before	Problems	After	Result
Complaint investigation process	All complaints are investigated by production engineers	work overload and unnecessary double process handling	Complaints are partially investigated & sign off by Technical Marketing Engineers	Reduction of time for responding to customers
	All complaints are started at Technical marketing engineers	Process of finding information, samples and photos at technical marketing are not necessary as considered as double handling	Export complaint is logged at Technical marketing engineers, detail information is directed to production engineer	Reduction of time for responding to customers
CAR investigation process	CAR process is embedded in the complaint investigation process	CAR system takes time and is not required to complete altogether with the complaint at the same time	Separation of CAR process from complaint investigation process	Reduction of time for responding complaint to customers
		CAR system is tied up with the complaint investigation under the time constraint, so CAR is not carefully determined and result in ineffective solutions	Redesign effective CAR process	Expected long term quality improvement
Samples and photos delivery	Using normal cameras for preliminary investigation	limited of use and slow film developing time	Use the digital cameras	Reduction of photos availability time
	Unscheduled transportation	No transportation to delivery samples	Scheduled transportation	Reduction of samples availability time
Work force	One technical marketing engineer	Work overload	Three technical marketing engineers	Reduction of overall technical marketing's process time
	Lack of training	incompleted samples and photos collection	Conduct required training to relevant engineers	Improve efficiency and accuracy of the process
Corrective and preventive action database	Not exist	No systematic record to provide information for engineers to	Exist in conjunction with CAR system	Database that helps analyzing causes and solutions of recurrence
Organization	Existence of Technical section	Double complaint process handling	Reorganize, not prolong the technical section to reduce double work handling	Reduction of process time while maintaining the accuracy

After the initial study in early 2001, some actions have been taken later on in the same year. Finally the new complaint resolution process is fully started on January 1st, 2002 which also corresponds with the new complaint number format and the new complaint update log.

The corrective and preventive action database is analysed and started at the end of March 2002, since it is correspondence with the new CAR system.

6.2 Results of implementation

The following shows the complaint update log during January 1st, 2002 to March 31st, 2002. It should be noted that during the implementation period, there are the commercial problems also found in the company. These problems existed for long time but have never been studied and recorded. The writer has found that, even though they are the minor problems in the business, the problem should be rectified and resolved. Hence the commercial problems are also recorded and the complaint resolution procedure is utilised to help providing the appropriate system to record these problems for future study. Anyhow, the commercial problems are not included in this study.

Table 6.2 Complaint data of January 2002 to March 2002

Complaint No	Category	Defect	Quality Tonne involved	Input Date	Total Paid Value (Bht)
02C001	Domestic	Prescratch	5.686	04-Jan-02	9097
02C002	Commercial	Wrong unit price	2.426	07-Jan-02	7278
02C003	Commercial	Wrong unit price	1.455	07-Jan-02	912
02C004	Commercial	Wrong unit price	2.911	07-Jan-02	1892
02C005	Domestic	Wrong coil	3.355	08-Jan-02	4193
02C006	Domestic	Roll forming mark	3.2	08-Jan-02	0
02C007	Export	Paint peel off	34	10-Jan-02	0
02C008	Domestic	Uncoated	4.478	10-Jan-02	98418
02C009	Domestic	Resin stain	0.21	10-Jan-02	5802
02C010	Domestic	Undermass coil	2.57	16-Jan-02	2300
02C011	Domestic	Wrong coil	2.911	16-Jan-02	78527
02C012	Domestic	White Rust	6.022	16-Jan-02	0
02C013	Domestic	Darkening	5.568	16-Jan-02	5568
02C014	Domestic	Undermass coil	1.293	16-Jan-02	31445

02C015	Commercial	Wrong unit price	6.093	17-Jan-02	0
02C016	Domestic	Darkening	4.56	18-Jan-02	8969
02C017	Domestic	Weight loss	2.887	18-Jan-02	50522
02C018	Domestic	paint roll mark	20.868	18-Jan-02	0
02C019	Export	Uncoated	32.05	17-Jan-02	0
02C020	Commercial	Wrong unit price		22-Jan-02	13256
02C021	Commercial	Over quantity shipped for project proforma discounted		22-Jan-02	0
02C022	Domestic	Uncoated	7.658	23-Jan-02	0
02C023	Domestic	Uncoated	4.568	23-Jan-02	0
02C024	Domestic	Uncoated	13.014	23-Jan-02	23104
02C025	Commercial	Wrong unit price	0	23-Jan-02	0
02C026	Domestic	Dent	4.004	23-Jan-02	108391
02C027	Domestic	Uncoated	3.92	23-Jan-02	7854
02C028	Domestic	Uncoated	2.038	29-Jan-02	53409
02C029	Domestic	Damaged coil	1.72	31-Jan-02	10750
02C030	Commercial	Wrong unit price	0	01-Feb-02	0
02C031	Commercial	Wrong unit price	0	01-Feb-02	0
02C032	Commercial	Wrong unit price	0	05-Feb-02	21642
02C033	Commercial	Wrong unit price	0	05-Feb-02	38051
02C034	Domestic	Colour variation	9.367	05-Feb-02	0
02C035	Domestic	Fail antistatic	9.367	05-Feb-02	0
02C036	Domestic	undermass coil	2.987	06-Feb-02	59296
02C037	Domestic	Wrong thickness	6.4	05-Feb-02	0
02C038	Domestic	Track off	0.81	06-Feb-02	4860
02C039	Domestic	uncoated	2.181	06-Feb-02	116365
02C040	Domestic	Wave	2.806	11-Feb-02	14384
02C041	Commercial	wrong unit price	25.18	11-Feb-02	755
02C042	Commercial	wrong unit price	5.154	12-Feb-02	8029
02C043	Domestic	No resin	3.3	14-Feb-02	0
02C044	Domestic	Dent	0.01	14-Feb-02	3402
02C045	Domestic	Dent	43.354	15-Feb-02	49266
02C046	Domestic	Wrong coil	9.261	18-Feb-02	347227
02C047	Export	Wave	12.395	20-Feb-02	0
02C048	Export	Wave	32.722	20-Feb-02	0
02C049	Domestic	Wrong coil	3.838	21-Feb-02	73919
02C050	Domestic	Wrong coil	4.621	21-Feb-02	7002

02C051	Domestic	Wrong coil	4.17	21-Feb-02	115567
02C052	Domestic	Wrong coil	4.032	21-Feb-02	70560
02C053	Domestic	black spot	3.703	22-Feb-02	0
02C054	Domestic	Weight loss	0.28	22-Feb-02	2240
02C055	Commercial	wrong unit price	0	22-Feb-02	8069
02C056	Domestic	Bore collaspe	2.84	25-Feb-02	80558
02C057	Commercial	Wrong unit price		28-Feb-02	0
02C058	Domestic	White rust	0.745	01-Mar-02	0
02C059	Export	Wave	27.265	05-Mar-02	0
02C060	Export	uncoated	41.46	05-Mar-02	0
02C061	Domestic	hole in coil	0.03	06-Mar-02	0
02C062	Export	Paint peel off	7.534	06-Mar-02	42100
02C063	Export	Paint peel off	17.4	06-Mar-02	0
02C064	Commercial	Wrong unit price	8.9	08-Mar-02	24920
02C065	Domestic	Uncoated	7.952	13-Mar-02	424271
02C066	Commercial	Wrong unit price	2.54	13-Mar-02	0
02C067	Commercial	Wrong shipment	2.817	11-Mar-02	81805
02C068	Commercial	Wrong unit price	12.948	12-Mar-02	3884
02C069	Commercial	Wrong unit price	4.724	12-Mar-02	7468
02C070	Domestic	Wrong coil	2.114	13-Mar-02	58980
02C071	Domestic	Dishing	9	13-Mar-02	0
02C072	Domestic	Damaged coil	0.8	13-Mar-02	0
02C073	Domestic	Wrong thickness	1.093	14-Mar-02	16395
02C074	Domestic	Split	1.4	21-Mar-02	0
02C075	Commercial	Wrong unit price	1.529	25-Mar-02	25228
02C076	Commercial	Wrong unit price	0.318	28-Mar-02	0
02C077	Commercial	Wrong coil weight	0.12	28-Mar-02	0
02C078	Domestic	Dent	3.23	28-Mar-02	88050

When the analysing is prepared for complaints, the documentation problems are excluded as the following table

Table 6.3 Complaint data of January 2002 to March 2002 (revised)

Number	Complaint No	Category	Defect	Quality Tonne involved	Input Date	Total Paid Value (Bht)
1	02C001	Domestic	Prescratch	5.686	04-Jan-02	9097
2	02C005	Domestic	Wrong coil	3.355	08-Jan-02	4193
3	02C006	Domestic	Roll forming mark	3.2	08-Jan-02	0
4	02C007	Export	Paint peel off	34	10-Jan-02	0
5	02C008	Domestic	Uncoated	4.478	10-Jan-02	98418
6	02C009	Domestic	Resin stain	0.21	10-Jan-02	5802
7	02C010	Domestic	Undermass coil	2.57	16-Jan-02	2300
8	02C011	Domestic	Wrong coil	2.911	16-Jan-02	78527
9	02C012	Domestic	White Rust	6.022	16-Jan-02	0
10	02C013	Domestic	Darkening	5.568	16-Jan-02	5568
11	02C014	Domestic	Undermass coil	1.293	16-Jan-02	31445
12	02C016	Domestic	Darkening	4.56	18-Jan-02	8969
13	02C017	Domestic	Weight loss	2.887	18-Jan-02	50522
14	02C018	Domestic	Paint roll mark	20.868	18-Jan-02	0
15	02C019	Export	Uncoated	32.05	17-Jan-02	0
16	02C022	Domestic	Uncoated	7.658	23-Jan-02	0
17	02C023	Domestic	Uncoated	4.568	23-Jan-02	0
18	02C024	Domestic	Uncoated	13.014	23-Jan-02	23104
19	02C026	Domestic	Dent	4.004	23-Jan-02	108391
20	02C027	Domestic	Uncoated	3.92	23-Jan-02	7854
21	02C028	Domestic	Uncoated	2.038	29-Jan-02	53409
22	02C029	Domestic	Damaged coil	1.72	31-Jan-02	10750
23	02C034	Domestic	Colour variation	9.367	05-Feb-02	0
24	02C035	Domestic	Fail antistatic	9.367	05-Feb-02	0
25	02C036	Domestic	Undermass coil	2.987	06-Feb-02	59296
26	02C037	Domestic	Wrong thickness	6.4	05-Feb-02	0
27	02C038	Domestic	Track off	0.81	06-Feb-02	4860
28	02C039	Domestic	Uncoated	2.181	06-Feb-02	116365
29	02C040	Domestic	Wave	2.806	11-Feb-02	14384
30	02C043	Domestic	No resin	3.3	14-Feb-02	0

31	02C044	Domestic	Dent	0.01	14-Feb-02	3402
32	02C045	Domestic	Dent	43.354	15-Feb-02	49266
33	02C046	Domestic	Wrong coil	9.261	18-Feb-02	347227
34	02C047	Export	Wave	12.395	20-Feb-02	0
35	02C048	Export	Wave	32.722	20-Feb-02	0
36	02C049	Domestic	Wrong coil	3.838	21-Feb-02	73919
37	02C050	Domestic	Wrong coil	4.621	21-Feb-02	7002
38	02C051	Domestic	Wrong coil	4.17	21-Feb-02	115567
39	02C052	Domestic	Wrong coil	4.032	21-Feb-02	70560
40	02C053	Domestic	Black spot	3.703	22-Feb-02	0
41	02C054	Domestic	Weight loss	0.28	22-Feb-02	2240
42	02C056	Domestic	Bore collapse	2.84	25-Feb-02	80558
43	02C058	Domestic	White rust	0.745	01-Mar-02	0
44	02C059	Export	Wave	27.265	05-Mar-02	0
45	02C060	Export	Uncoated	41.46	05-Mar-02	0
46	02C061	Domestic	Hole in coil	0.03	06-Mar-02	0
47	02C062	Export	Paint peel off	7.534	06-Mar-02	42100
48	02C063	Export	Paint peel off	17.4	06-Mar-02	0
49	02C065	Domestic	Uncoated	7.952	13-Mar-02	424271
50	02C070	Domestic	Wrong coil	2.114	13-Mar-02	58980
51	02C071	Domestic	Dishing	9	13-Mar-02	0
52	02C072	Domestic	Damaged coil	0.8	13-Mar-02	0
53	02C073	Domestic	Wrong thickness	1.093	14-Mar-02	16395
54	02C074	Domestic	Split	1.4	21-Mar-02	0
55	02C078	Domestic	Dent	3.23	28-Mar-02	88050
Total				445.047		2072791

There are a total of 55 quality complaints occurring during January 2002 to March 2002. They involve 445.047 tons of products which involve the financial claims of 2,072,791 baht. The complaint that shows zero baht payment implies that the complaint is not justified.

6.3 The complaint time response analysis

According to the weekly complaint update log, the average complaint response time is as following

Table 6.4 Overall complaint process time of January 2002 to March 2002

	Total Number of complaints	total average time day(s)	Assigned investigation	Number of complaints	Average time day(s)
Overall complaint process time	55	17.90	Technical marketing	39	2.76
			Production	16	54.81
Settlement time		11.99			
Total average complaint response time day (s)		29.89			

It is shown that the complaint process time for investigation averagely account for 17.90 days as calculated from 55 quality complaints.

For further detail, there are 39 complaints investigated and signed off by technical marketing. The balance of 16 complaints are investigated and signed off by the production team. The investigation taken by technical marketing team average account for 2.76 days while the production team averagely accounts for 54.81 days.

For information, the claim settlement and credit note process, which is excluded from the study takes averagely 11.99 days to finish.

6.3.1 The activity analysis for Technical marketing complaint process

During the study period, there are 39 technical marketing investigated complaints. During study, there are only two activities in the process

1. Investigation and sign off

The complaints are investigated and sign off altogether due to the fact that the process involves only few technical marketing persons. Where complaint is properly investigated by the technical marketing engineer, it is ready for the technical marketing manager to sign off at he same time. In additional, the technical marketing engineer can also immediately rectify and suggest the solution for customer during the investigation. The indirect benefit is

sometimes the defective product can be earlier recovered and utilized without any cost to any party, base on win-win approach.

2. The claim settlement and Credit note process

Following is the diagram shows the time usage in the process

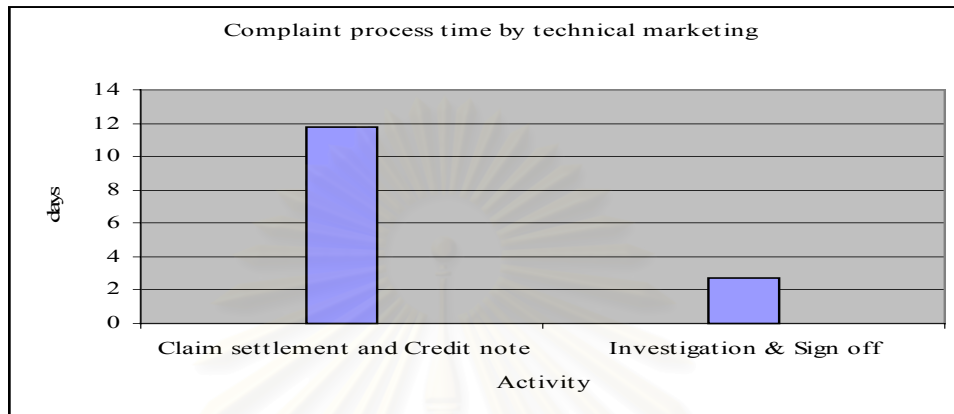


Figure 6.1 Complaint process time of technical marketing

6.3.2 The activity analysis for production team complaint process

During the study period, there are 16 production investigated complaints. The following diagram shows the time usage in the process

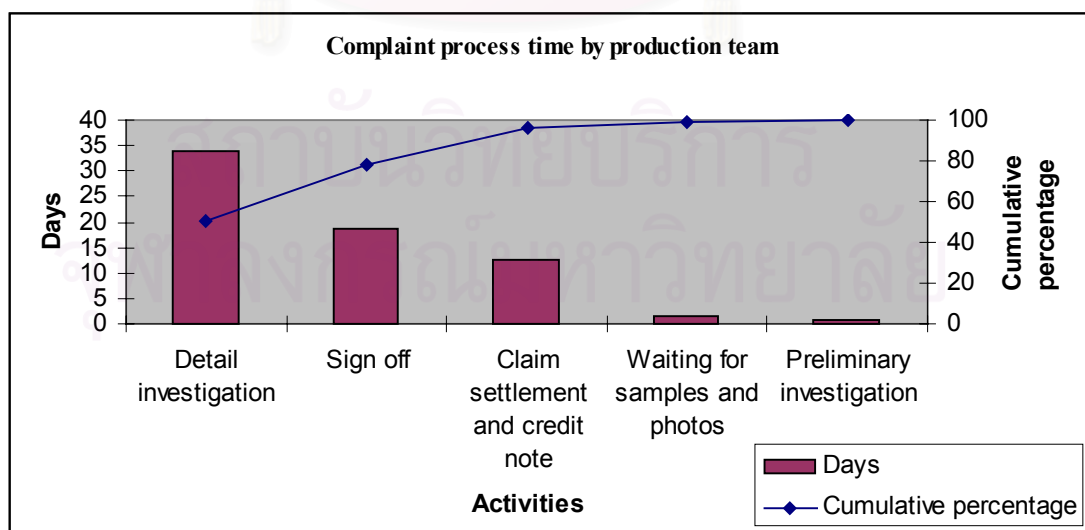


Figure 6.2 The complaint process time of Production team

It is shown that the detail investigation and the sign off time account for 33.8 days and 18.6 days accordingly. When compared to the previous study during January 2001 to March 2001 before the improvement. It is interesting to see that the process time increases.

The process time for Detail investigation increases from 25.2 days to 33.8 days and the sign off time increases from 3.2 days to 18.6 days. The writer found that the reason of this matter is due to

1. The new process has affected the practice of complaint investigation. It is found that most complaints are investigated by technical marketing. The special complaints or difficult complaints will be determined by technical marketing to forward to production engineer. So the production engineers will only deal with the small number of complaints, but all the difficult and complex complaints. So they need more time to study, consider and conduct testing on the defect to ensure the right decision is made. This also affects the manager that he will need to be carefully considering the investigation done by engineers before signing off.
2. The change of the manufacturing manager. The new manufacturing manager was joining the company last year. He always works with very detail to ensure everything is correct. This also results in loner sign off time.
3. The export complaints are still under the production engineer's responsible. It requires detail communication directly with oversea customer which may increase times.

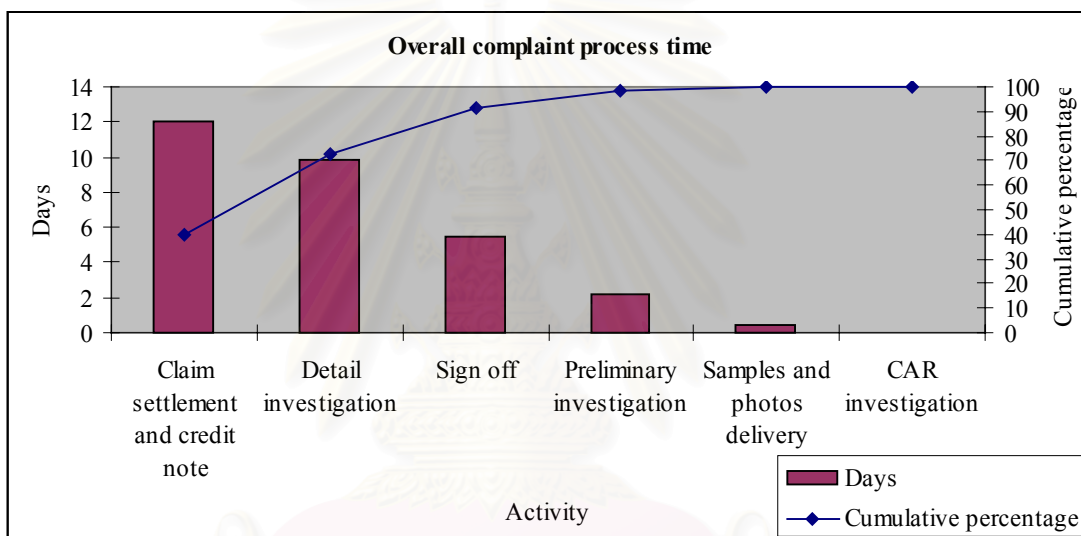
6.3.3 Comparison of overall complaint process

When combine all complaint process and conduct further analysis. We have found that the overall process time is as following

Table 6.5 Overall complaint process time for each activity

	Claim settlement and credit note	Detail investigation	Sign off	Preliminary investigation	Samples and photos delivery	CAR investigation
Days	12.00	9.84	5.44	2.24	0.40	0.00
Cumulative percentage	40.12	73.01	91.19	98.66	100.00	100.00

Using the Pareto diagram, the complaint process time can be summarized as following.

**Figure 6.3 Overall complaint process time Pareto analysis**

It should be noted that even though there are additional two technical marketing engineers which can be considered as investment, there also be a reduction of two Manufacturing department's staffs, the Technical Manager and the product specialist, as a result from the reorganization. When considers the overall employees involvement, there still be the similar amount of workforce, which we can consider there is no additional investment in work force to improve the process.

It is also found that the basis of complaints investigation is still similar between before and after study, due to the following findings

1. The defects type remains unchanged. There is no significant sign of special defects.
2. The tonnage of sales is still significantly similar.

3. The sales revenue is still significantly similar.
4. Majority of product remain unchanged.

6.4 The updated database system

After June 2002, a database has been added with the new defects that recurrence during January 2002-June 2002. The database has grown and contained more information about defects' causes and solutions. It is useful for the future complaint analysis. The updated database is shown in Appendix B.



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CHAPTER 7

CONCLUSION AND RECOMMENDATION

7.1 Conclusion

After the implementation of the new designed complaint management system, there was a great improvement in terms of process time of customer complaints. The waste of the process have been identified and eliminated. This leads to the better customer satisfaction and provide the company more business opportunity.

The Corrective Action Request system had been redesigned and clarified. As a result the better improvement in quality has been gained. The system also leads to further advance database that tracks and shows the recurrence of defects. The database is continuously updated to provide the new information about the defect's causes and solutions.

7.1.1 Reduction in process time

We can compare the complaint process time by combining the analysis of Jan-Jun 2002 against the data studied in Jan-Mar 2001 as follows:

Table 7.1 Overall complaint process time improvement summaries

	Detail investigation	Samples and photos delivery	CAR investigation	Claim settlement and credit note	Sign off	Preliminary investigation	Total
Jan -Mar 01 ; Before improvement (days)	25.24	14.02	12.26	11.35	3.84	2.58	69.3
Jan -Mar 02 ; After improvement (days)	9.84	0.40	0.00	11.99	5.44	2.24	29.9
Improvement (%)	61.04	97.15	100.00	-5.64	-41.69	13.32	56.9

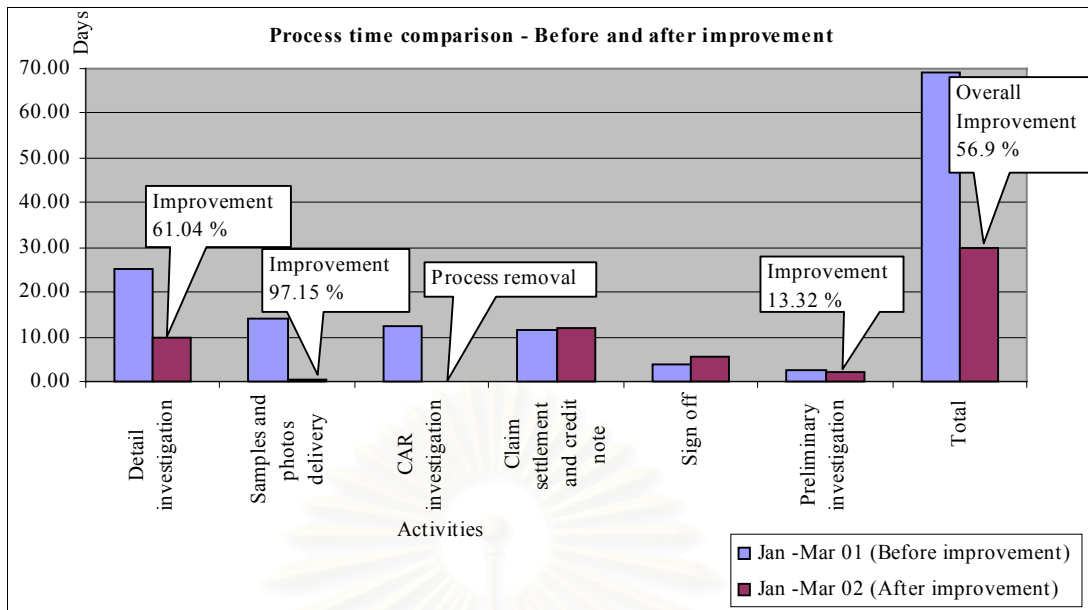


Figure 7.1 Overall complaint process time improvement summaries

From the data analysis, the overall complaint process time has improved (time reduced) 39.7 days from 69.3 days down to 29.6 days or 56.9%.

7.1.2 Reduction of complaint cost

Further analysis is done on the volume and financial settlement to understand the benefit of the redesigned Corrective Action System and The Corrective and Preventive Action for defects recurrence database. The following table shows the result of complaints tonnage and its financial settlement in comparison between the before improvement period and after improvement period.

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Table 7.2 Overall complaint tonnage and cost improvement summary

	Tonnage of complaint (ton)	Financial settlement (Million baht)	Tonnage Sales	Sales revenue (Million baht)	Percentage of complaint against Sales (T)	Percentage of complaint against Sales (Baht)
Jan –Mar 01 (before improvement)	1528.4	5.67	28724.85	748.89	5.32	0.75
Jan-Mar 02 (after improvement)	445.047	2.07	29084.55	792.204	1.53	0.26
Improvement	1083.35	3.6			3.79	0.49
Improvement measure by %	70.88	63.46			71.24	65.46

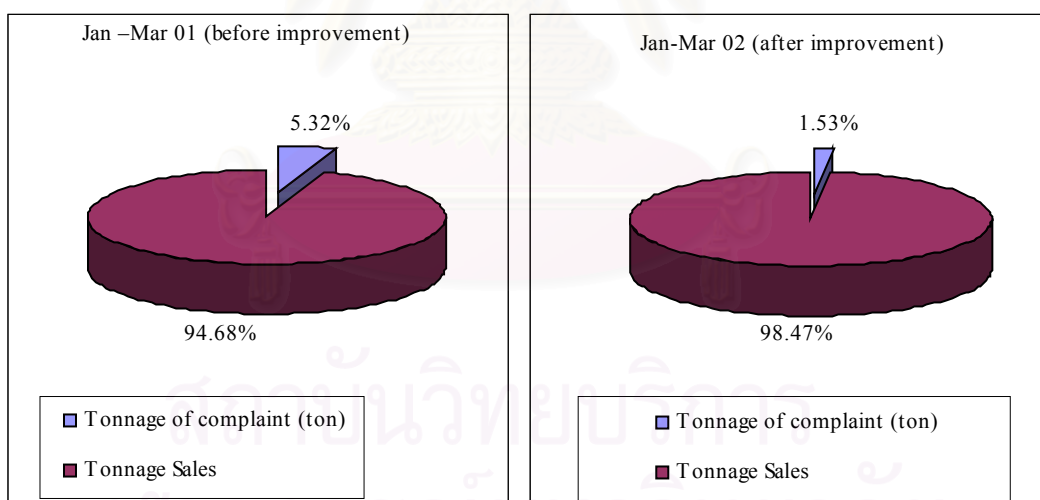


Figure 7.2 Improvement of complaints in tons against tonnage sales

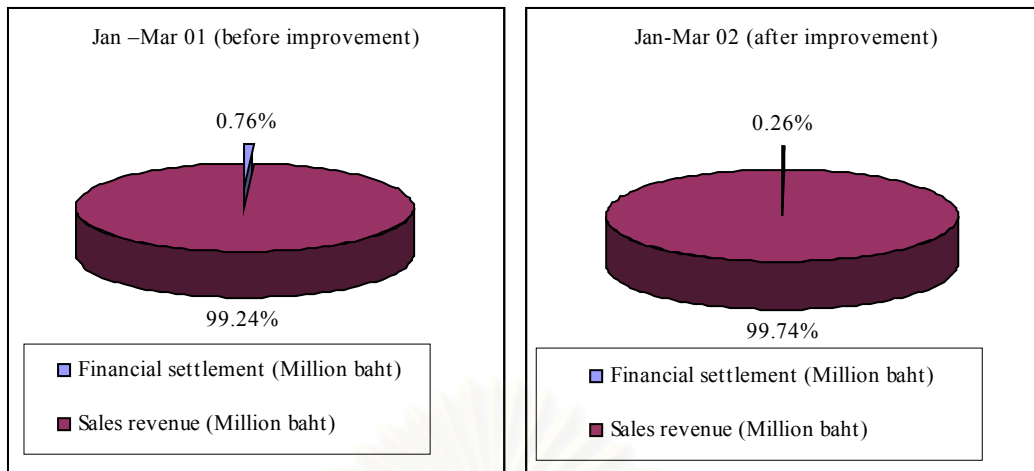


Figure 7.3 Improvement of complaints claim against sales revenue

7.2 Discussion

7.2.1 The management support

It is commonly known that quality improvement activities can be a success by heavily based on the management's support. In this study, the management support, through the manufacturing manager, is not causing any problem which is the key success factor. The management should be aware of the competition in the market and push every effort to create company's competitiveness. The studied company realised that the complaint management system can also affect the customer satisfaction significantly. So, as a result, the study that could improve the customer satisfaction is fully supported.

7.2.2 The discipline of data collection

One of the key activities in this study is to collect data from the multiple sources. The writer has found that, between departments, there still be difference in naming the defects. The defects in the steel manufacturing companies occur in hundred different types. So the naming of the defect should be standardized, at least within the same company. This creates some difficulties in communication and also the further improvement which could be based on advance computerized database

7.2.3 The continuous improvement

The existing database should be maintain and updated frequently. The design of the system and the database may result in significant improvement in short terms, so the greater benefits can be gained in long term by keep utilizing and improving the system.

7.2.4 The implementation of ISO 9001

During the study period, the company has implemented the ISO 9001 accreditation. This matter affects the design of the complaint management system since it is directly related to quality and customer. The implementation of ISO 9001 have caused the delayed in the study due to some changes are required to align with ISO 9001's requirement. Anyhow, the majority of the study still fit to the requirement stated by ISO 9001.

7.3 Recommendations

7.3.1 Advanced computerized database system

The current system is still based on the plain Microsoft Office Program. This is suitable because the database is still small at the initial stage. It is the best format under current situation due to no additional cost is applied. But in the longer term, as the database keeps continuously updated and growing bigger, the sophisticated computer program should be implemented. It should allow multi users access as it is possible that the system may expand for greater use.

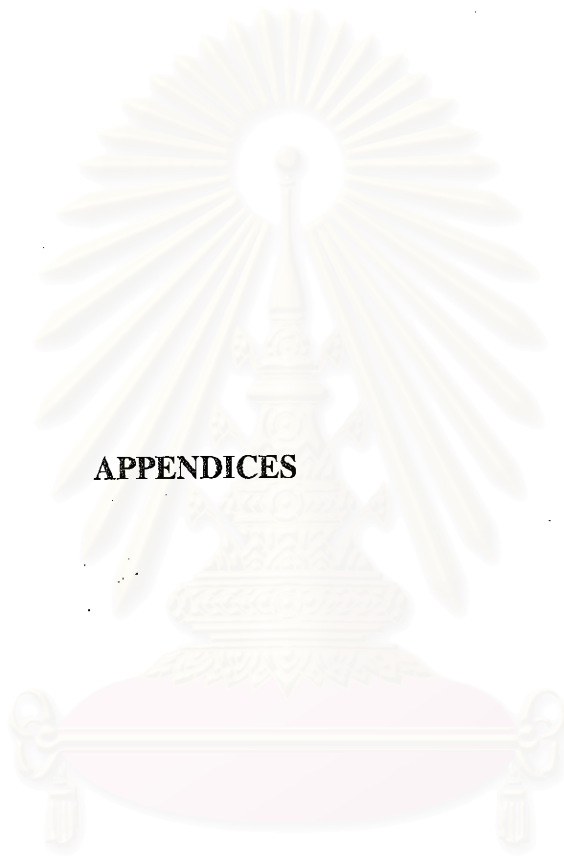
7.3.2 Implementation of system to control the commercial problem

As previously discussed, during the study process, the writer has found the commercial problems exist. The initial action to control and study the commercial problems have been started by utilizing the complaint management system. In the near future, there should be a system to process and analyze these problems, the process may or may not involve the complaint management system upon the result of future study.

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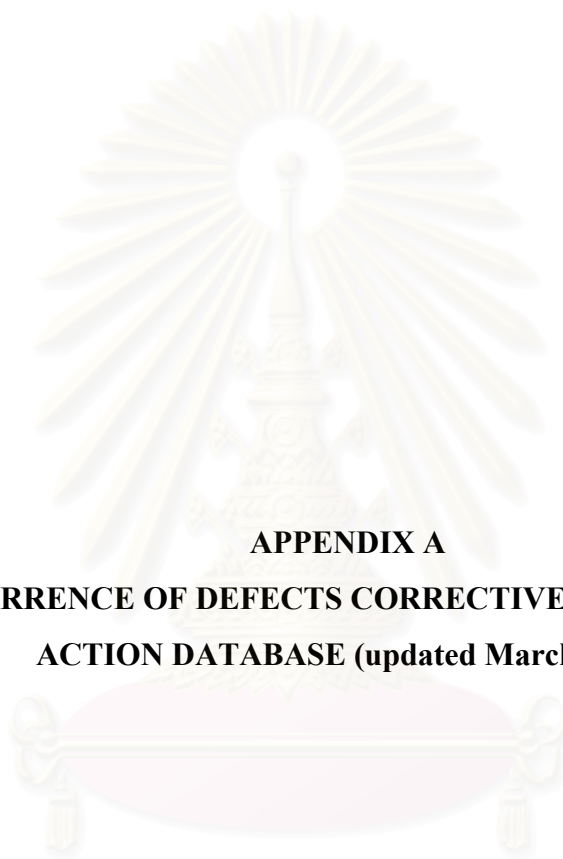
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APPENDICES

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX A
THE RECURRENCE OF DEFECTS CORRECTIVE AND PREVENTIVE
ACTION DATABASE (updated March 2002)

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Corrective and Preventive Action for defects recurrence database

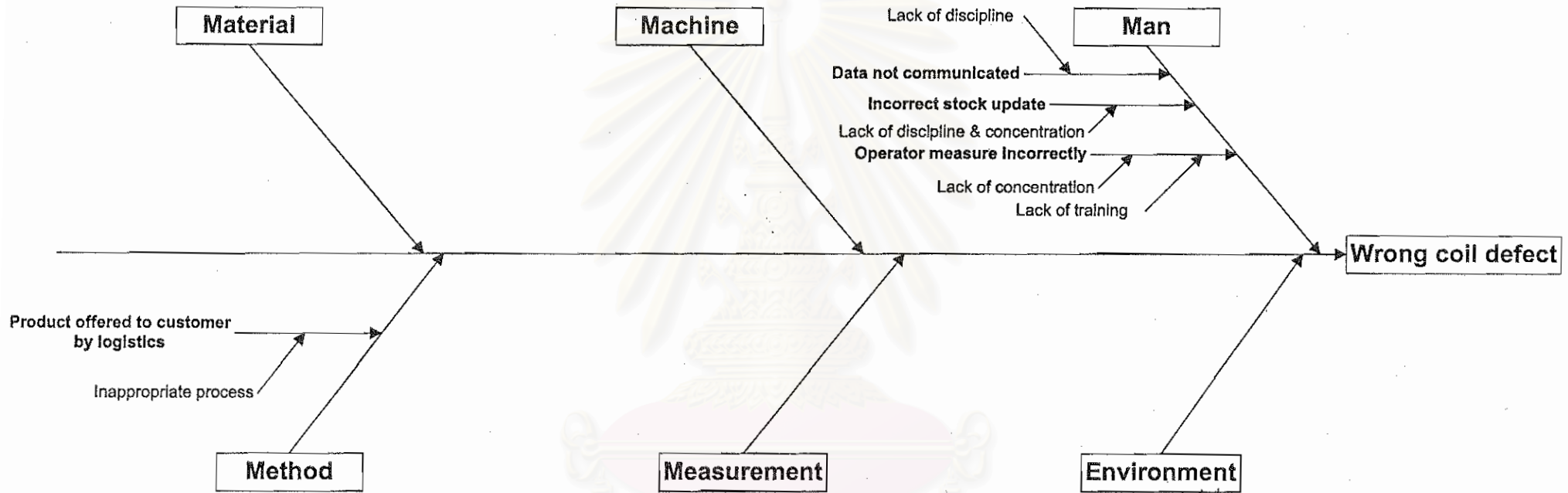
DEFFECT
Prepared by
Original date
Revision date

Wrong coils
Dechakom B.
23/2/02
1/8/2002

No
Recurrence of defect

8

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Data not communicate	Lack of discipline	1	Training for logistic about offer coil process	Chindara	02C011
	Incorrect Stock update	Lack of discipline & concentration	1	Refresh trainig for Stock update / put correct coll in correct bucket	Planner with engineer	02C049
	Operator Measure incorrectly	Lack of concentration & training	1	Feedback to operator about concentration	Kamchai	02C070
Machine						
Material						
Method	Loglstics offer coil directly to customer, not passing sales without enough communication	Imappropriate process	1	Set up process / Offer stock product to customer only by sales	Chindara	02C011
Measurement						
Environment						



Corrective and Preventive Action for defects recurrence database

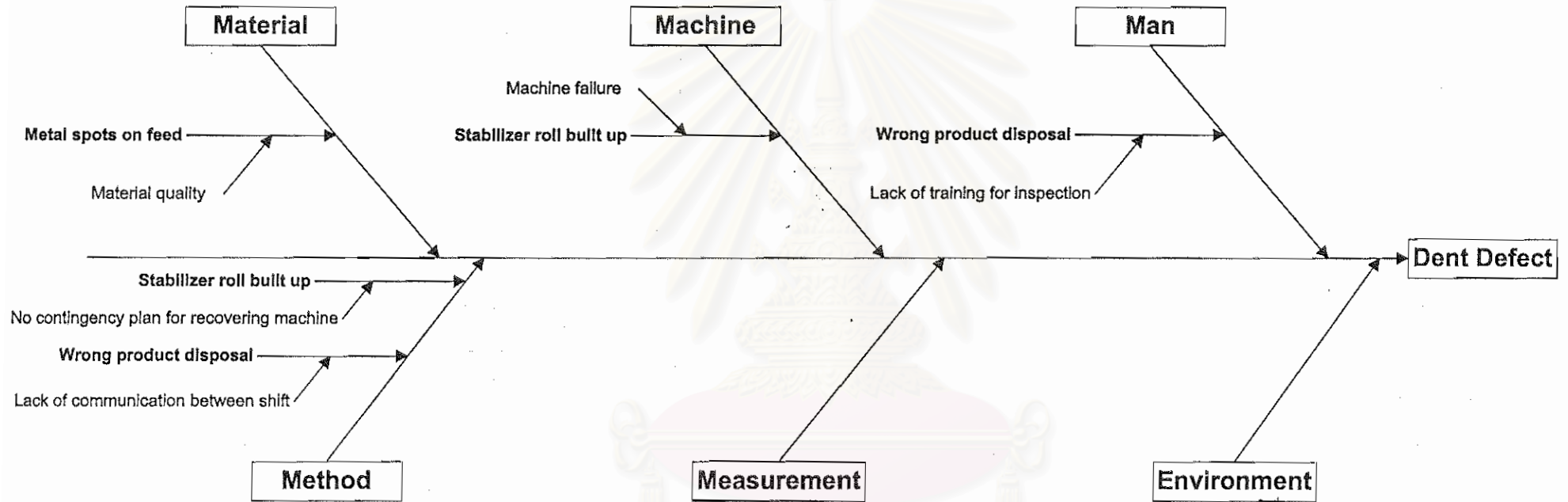
DEFECT
 Prepared by
 Original date
 Revision date

DENT
 Dechakom B.
 19/2/02
 1/8/2002

No
 Recurrence of defect

3
 4

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Wrong product disposal	Lack of inspection discipline	3	Refresh training on inspection	Suchat J	02C044, 02C045, 02C078
Machine	Stabilizer roll built up	Machine failure	2	Manual clean by scrapper immediately when problem occur	Pot operator	02C045,02C078
Material	Metal spots on feed	Material quality	1	More inspection on surface / cut it at MCL and CPL	Kamchai/Saharat	02C044
Method	Stabilizer roll built up	No contingency plan for recovering machine	2	Manual clean by scrapper immediately when problem occur	Pot operator	02C045, 02C078
	Wrong product disposal	Lack of communication between shift	1	Setup meeting for communication between shift change	Suchat J	02C045, 02C078
Measurement						
Environment						



Corrective and Preventive Action for defects recurrence database

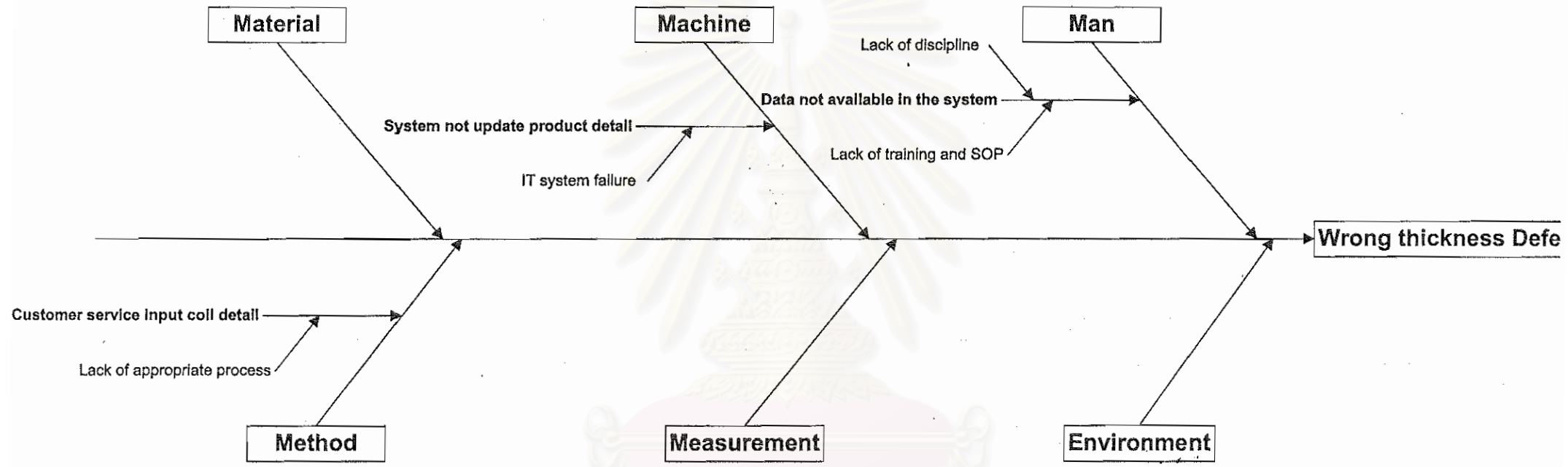
DEFECT
 Prepared by
 Original date
 Revision date

Wrong thickness
 Dechakom B.
 15/3/02
 3/7/2002

No
 Recurrence of defect

4
 2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Data not put in the system	Lack of discipline	1	Refresh training about putting data in the system	Planner	02C073
		Lack of training and SOP	2			
Machine	system not update the product detail	IT system failure	1	IT recover the system	IT	02C073
Material						
Method	Customer service inout coil detail manually	Inappropriate process	1	Inform Customer service not to put coil detail manually	Customer service	02C073
Measurement						
Environment						



Corrective and Preventive Action for defects recurrence database

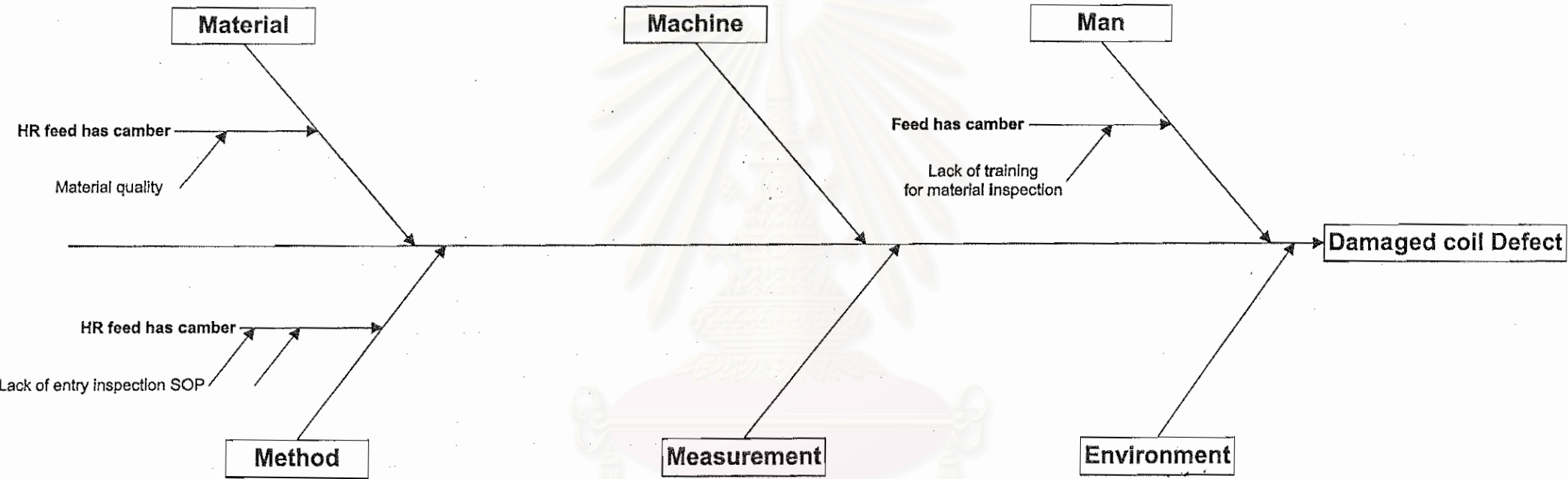
DEFECT
 Prepared by
 Original date
 Revision date

Damaged coil
 Dechakom B.
 20/1/02
 19/4/02

No
 Recurrence of defect

5
 2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Feed with camber is not detected	Lack of training for material inspection	1	Refresh training for inspection coil entry	Nithat	02C029
Machine						
Material	HR feed has camber	Material quality substandard	1	inform Supplier	Nithat	02C029
Method	HE feed has camber	Lack of inspection standard	1	Set up technical protocol for incoming inspection	Nithat	02C029
Measurement						
Environment						



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

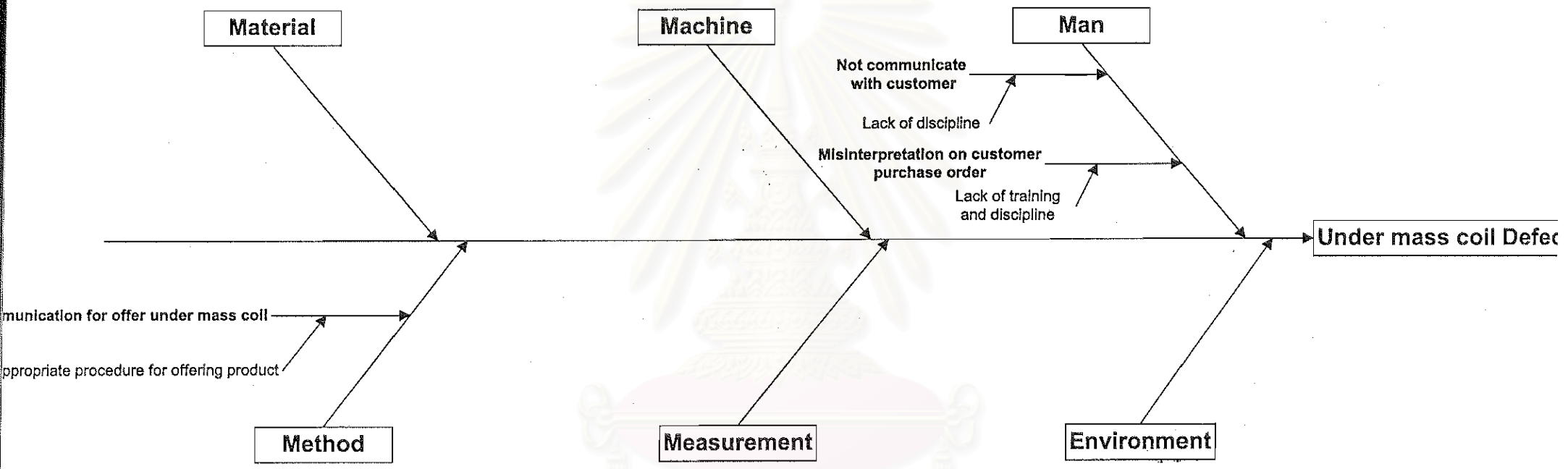
Under Mass coil
 Dechakom B.
 23/2/02
 31/7/02

No
 Recurrence of defect

8
 9

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Customer is not communicated for offering product	Lack of discipline	2	Refresh training to ensure the communication with customer before despatched product	Seetawan	02C014, 02C036
	Misinterpretation on customer purchase order	Lack of training and discipline	1	Refresh training for sales to confirm the PO with customer	Suwat	02C010
Machine						
Material						
Method	Inadequate communication for offer under mass coil	Lack of appropriate process	2	Set up standard for offering coil to customer	Seetawan	02C014, 02C036
Measurement						
Environment						

จุฬาลงกรณ์มหาวิทยาลัย



Corrective and Preventive Action for defects recurrence database

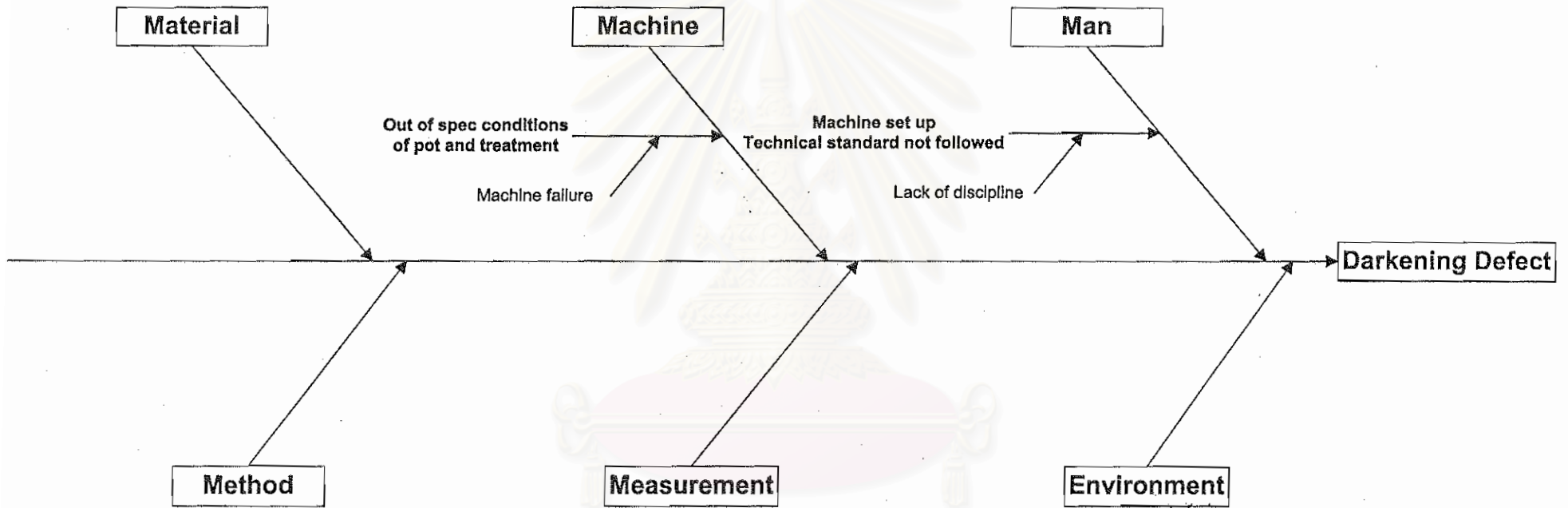
DEFECT
 Prepared by
 Original date
 Revision date

Darkening
 Dechakom B.
 23/2/02
 1/8/2002

No
 Recurrence of defect

7
 2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Machine set up technical standard not followed	Lack of training and discipline	2	Refresh training to return to machine set up technical standard ST-MCL; 14.4 SSD resistant TruZinc) and compliance audit	Suchat J	02C013, 02C016
Machine	Out of spec conditions for pot & treatment	Machine failure	2	Return to machine set up technical standard ST-MCL; 14.4 SSD resistant TruZinc) and compliance audit	MCL team	02C013, 02C016
Material						
Method						
Measurement						
Environment						



Corrective and Preventive Action for defects recurrence database

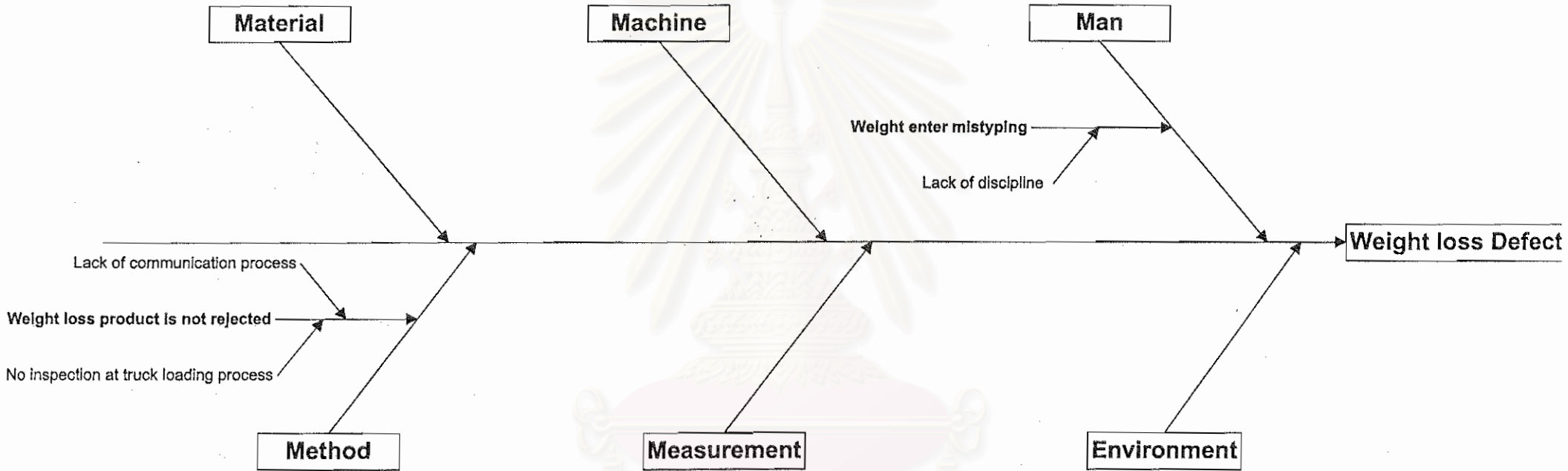
DEFECT
Prepared by
Original date
Revision date

Weight loss
Dechakom B.
23/2/02
1/8/2002

No
Recurrence of defect

8
2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Mistying Weight enter	Lack of discipline	2	Refresh training	Operator	02C017
Machine						
Material						
Method	Weight loss product is not rejected	Lack of communication in process	2	Notify the difference to loading team	Despatcher	02C017
		No inspection at truck loading process	2	Weight bridge, operator to stop truck once the weight difference occurs	Weight bridge operator	02C017
Measurement						
Environment						



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Corrective and Preventive Action for defects recurrence database

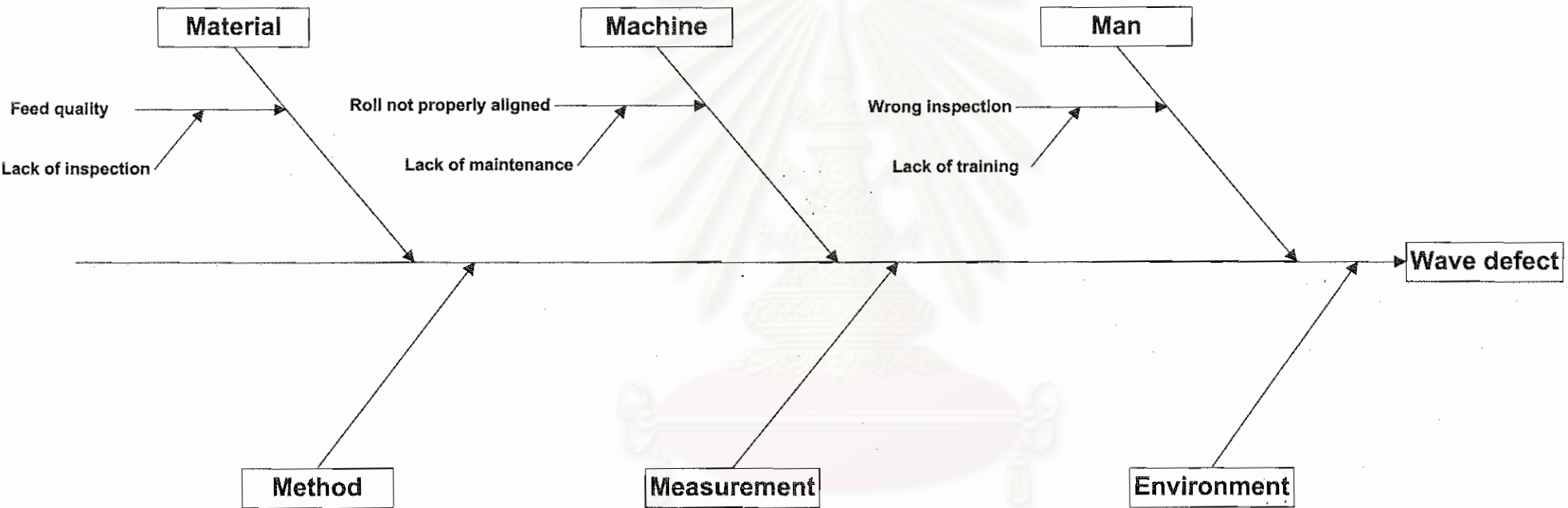
DEFECT
 Prepared by
 Original date
 Revision date

Wave
 Dechakom B.
 25/3/02
 25/3/02

No
 Recurrence of defect

9
 4

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Wrong inspection	Lack of training	1	Refresh training	Wisit K	02C040
Machine	Roll not properly aligned	Lack of maintenance	1	Refresh training and maintenance according to technical standard	Wisit K	02C047
Material	Feed Quality	Lack of incoming inspection	2	Refresh training	Wisit K	02C078, 02C040
Method						
Measurement						
Environment						



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Corrective and Preventive Action for defects recurrence database

DEFECT
Prepared by
Original date
Revision date

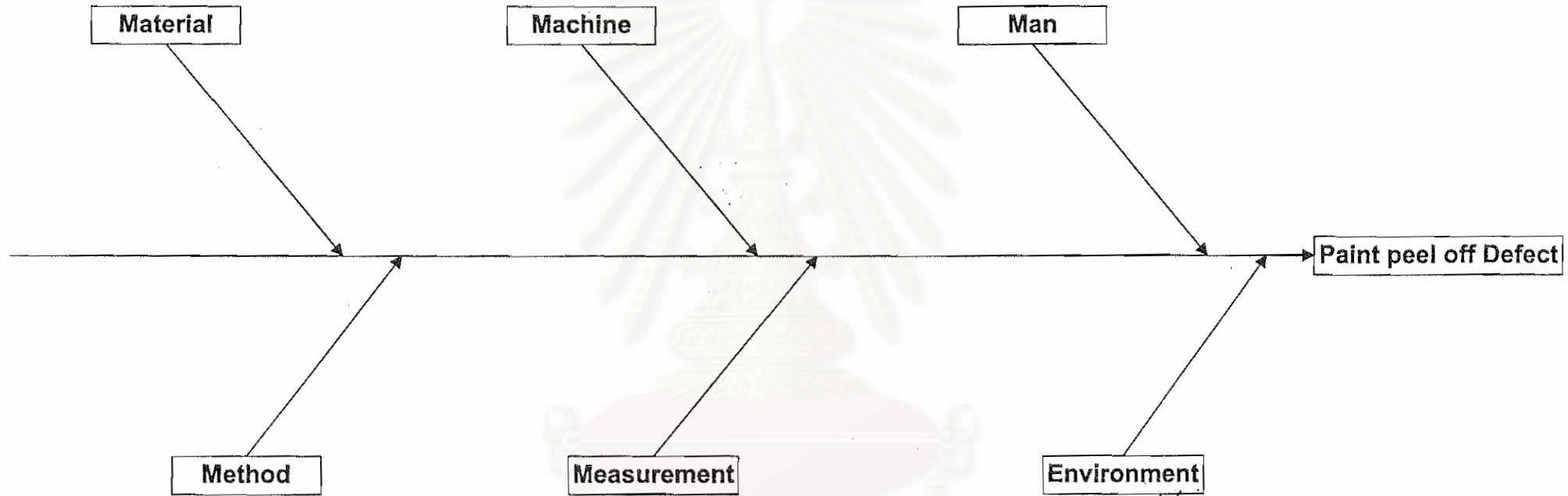
Dechakom B.

No
Recurrence of defect

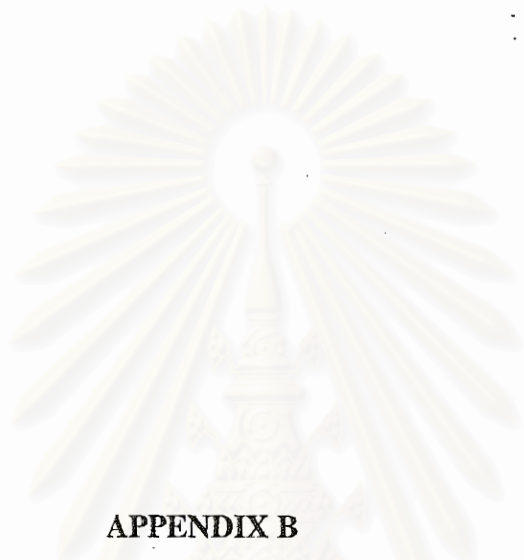
10
3

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man						
Machine						
Material						
Method						
Measurement						
Environment						

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX B

**THE RECURRENCE OF DEFECTS CORRECTIVE AND PREVENTIVE
ACTION DATABASE (updated June 2002)**



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

Corrective and Preventive Action for defects recurrence database

DEFECT
Prepared by
Original date
Revision date

Uncoated
Dechakom B.
23/2/03
1/8/2002

No
Recurrence of defect

1
13

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Wrong evaluation in lockseam test	Lack of training, Lack of discipline	3	Refresh training by lab tester for more concentrate on lab result and followed by SOP and technical standard	Suchat J	02C039,02C062,02C065
	Wrong product disposition	Lack of training, lack of discipline	1	Refresh training for coil dispositioning	Suchat J	02C079M
Machine	Out of spec conditions for cleaner & Furnace	Machine failure	4	Return equipment to spec / regular check up	Saharat P.	02C008, 02C023, tec-mcl-020702,tec-mcl-020705
	Uncoated from Zinc dust on G300 product		2	HNX elards back to 100%, by pass manual and wait for spare part to fix Insulated anout on top & Bottom	Kongkiat R	02C024, 02C027
Material	Hole in HR coil feed	Material Quality	1	Remove hole from prime coil	Exirt operator	02C027
Method	Incorrect set up and control of cleaner & Furnace	Lack of appropriate method	2	Establish standard and audit compliance	Saharat P.	02C008M, 02C023
	No competency process of investigation		1	Recheck the right message until complete flow, hard copy from manufactring report	Chindara S	02C028
	while do stock take reconciliation			The unknown coil (new coil) has no movement until finish Invetigate and get right label	Songphon	02C028
Measurement						
Environment						

Corrective and Preventive Action for defects recurrence database

DEFECT
 Praped by
 Original date
 Revision date

Wrong coils
 Dechakom B.
 23/2/02
 1/8/2002

No
 Recurrence of defect

2
 10

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Data not communicate	Lack of discipline	1	Training for ligistic about offer coil process	Chindara	02C011	
	Incorrect Stock update	Lack of discipline & concentration	1	Refresh trainig for Stock update / put correct coil in correct bucket	Planner with engineer	02C049	
	Operator Measure incorrectly	Lack of concentration & training	1	Feedback to operator about concentration	Kamchai	02C070	
	Order entry under wrong width	Lack of discipline and concentration	2	Establish method to double check PO against products	Somkiat	02C084M, MKT-LOG-020518	
Machine							
Material							
Method	Logistics offer coil directly to customer, not passing sales without enough communication	Imappropriate process	1	Set up process / Offer stock product to customer only by sales	Chindara	02C011	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
Prepared by
Original date
Revision date

DENT
Dechakom B.
19/2/02
1/8/2002

No
Recurrence of defect

3
4

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Wrong product disposal	Lack of inspection discipline	3	Refresh training on inspection	Suchat J	02C044, 02C045, 02C078	
Machine	Stabilizer roll built up	Machine failure	2	Manual clean by scrapper immediately when problem occur	Pot operator	02C045,02C078	
Material	Metal spots on feed	Material quality	1	More inspection on surface / cut it at MCL and CPL	Kamchai/Saharat	02C044	
Method	Stabilizer roll built up	No contingency plan for recovering machine	2	Manual clean by scrapper immediately when problem occur	Pot operator	02C045, 02C078	
	Wrong product disposal	Lack of communication between shift	1	Setup meeting for communication between shift change	Suchat J	02C045, 02C078	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

Wrong thickness
 Dechakom B.
 15/3/02
 3/7/2002

No
 Recurrence of defect

4
 2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Data not put in the system	Lack of discipline	1	Refresh training about putting data in the system	Planner	02C073	
		Lack of training and SOP	2				
Machine	system not update the product detail	IT system failure	1	IT recover the system	IT	02C073	
Material							
Method	Customer service inout coll detail manually	Inappropriate process	1	Inform Customer service not to put coll detail manually	Customer service	02C073	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

Damaged coil
 Dechakom B.
 20/1/02
 19/4/02

No
 Recurrence of defect

5
 3

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Feed with camber is not detected	Lack of training for material inspection	1	Refresh training for inspection coil entry	Nithat	02C029	
Machine	Flattener side guide is not reliable	Machine incompatibility	1	Issue NSER to engineering team	Nithat	tec-pkl-020701	
Material	HR feed has camber	Material substandard quality	1	Inform Supplier	Nithat	02C029	
Method	HE feed has camber	Lack of inspection standard	1	Set up technical protocol for incoming inspection	Nithat	02C029	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

Under Mass coil
 Dechakom B.
 23/2/02
 31/7/02

No
 Recurrence of defect

6
 4

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Customer is not communicated for offering product	Lack of discipline	3	Refresh training to ensure the communication with customer before despatched product	Seetawan	02C014, 02C036, 02C093	
	Misinterpretation on customer purchase order	Lack of training and discipline	2	Refresh training for sales to confirm the PO with customer	Suwat	02C010, 02C093	
Machine							
Material							
Method	Inadequate communication for offer under mass coil	Lack of appropriate process	2	Set up standard for offering coil to customer	Seetawan	02C014, 02C036	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
Prepared by
Original date
Revision date

Darkening
Dechakom B.
23/2/02
1/8/2002

No
Recurrence of defect

7
2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Machine set up technical standard not followed	Lack of training and discipline	2	Refresh training to return to machine set up technical standard ST-MCL; 14.4 .SSD resistant TruZinc) and compliance audit	Suchat J	02C013, 02C016	
Machine	Out of spec conditions for pot & treatment	Machine failure	2	Return to machine set up technical standard ST-MCL; 14.4 SSD resistant TruZinc) and compliance audit	MCL team	02C013, 02C016	
Material							
Method							
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFFECT
 Praped by
 Original date
 Revision date

Weight loss
 Dechakom B.
 23/2/02
 1/8/2002

No
 Recurrence of defect

8
 2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Mistying Weight enter	Lack of discipline	2	Refresh training	Operator	02C017	
Machine							
Material							
Method	Weight loss product is not rejected	Lack of communication in process	2	Notify the difference to loading team	Despatcher	02C017	
		No inspection at truck loading process	2	Weight bridge, operator to stop truck once the weight difference occurs	Weight bridge operator	02C017	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
Prepared by
Original date
Revision date

Wave
Dechakom B.
25/3/02
25/3/02

No
Recurrence of defect

9
4

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref CAR no
Man	Wrong inspection	Lack of training	1	Refresh training	Wisit K	02C040
Machine	Roll not properly aligned	Lack of maintenance	1	Refresh training and maintenance according to technical standard	Wisit K	02C047
Material	Feed Quality	Lack of incoming inspection	2	Refresh training	Wisit K	02C078, 02C040
Method						
Measurement						
Environment						

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

Paint peel off
 Dechakom B.
 12/7/2002
 31/7/02

No
 Recurrence of defect

10
 4

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Misinspection	lack of discipline for inspection	1	Reinforce & refresh training	Line leader	tec-cpl-020703	
Machine							
Material							
Method	Paint chemical incompatible	new product design	1	NSPE & am ot offer standard product	Kamchai	Tec-cpl-020705	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

Coil collapse Defect
 Dechakom B.
 3/7/2002
 31/7/02

No
 Recurrence of defect

11
 3

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Incorrect uncoiling tension setting	Lack of discipline	1	Reinforce RSL operator to set tension correctly	Panida	tec-rsl-020701	
Machine							
Material	Bore loose	Thin gauge bore loose	2	add filament tape to keep bore in place	Songpon	Tec-cpl-020707,TE C-CPL-020707	
Method	Incorrect uncoiling tension setting	Incomplete production reporbt design	1	add tension setting record	Panida	tec-rsl-020701	
Measurement							
Environment							

Corrective and Preventive Action for defects recurrence database

DEFECT
 Prepared by
 Original date
 Revision date

No resin
 Dechakom B.
 10/7/2002
 30/8/02

No
 Recurrence of defect

12
 2

Factors of problems	Symptoms	Root cause	Frequency	Corrective and Preventive Action	Responsible person	Ref no	CAR
Man	Misinspection	Lack of discipline	1	refresh training on inspection and tagging defect	Suchat J	tec-MCL-020706	
Machine	Applicator rool retracted not found	No alarm system	1	Add alarm to the system	Suchat j	tec-mcl-020706	
Material							
Method							
Measurement							
Environment							



APPENDIX C
COMPLAINT RECORDS

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

CUSTOMER COMPLAINT – RECORD FORM

Complaint No. :	Date Entered :
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Customer Name :	Sales Representative :
Observation Place :	Complaint Description :

PRODUCT INFORMATION :

Product Name :	Thickness :	Width :	
Grade :	Coating Class :	Color :	Date Received :
End Use Category :	Customer Application :		

COIL INFORMATION :

Item	Coil No.	Date Coil Processed	Original Coil Weight	Rejected Weight	Claim weight
Total			Mt	Mt	Mt

Samples: Yes No Photos: Yes No

SUMMARY COMPLAINT INVESTIGATION :

Complaint Justified ? Yes No

Comment :


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Approved By : _____ Date : _____

Coil Disposition :

Return coils Scrap at Customer Site Other (Specify)

CUSTOMER COMPLAINT - RECORD FORM

DEFECT INFORMATION :
(attach Coil Inspection Form PR-MFT-00007-F-02)

Defect Name :	Date Inspected :
What is the Defect?	
Where is the Product when Defect detected?	
Where is the Defect on Coil or Strip?	
When was the Defect first observed? (order/date/coil)	
When have we seen this Defect since first observed? (orders/dates/coils)	
When did Customer see Defect? (during unpacking, uncoiling, processing, etc)	
How many Coils supplied & How many affected with Defect?	
How much of any one Coil affected?	
How many Defects are on any one Coil?	
Current Product Status : <input type="checkbox"/> Flat Sheet <input type="checkbox"/> Formed Sheet <input type="checkbox"/> Coil <input type="checkbox"/> Other (Specify)	
Customer Comment & Request :	
Additional Comments :	

CUSTOMER COMPLAINT – RECORD FORM

SUMMARY TECHNICAL MARKETING :

Complaint Justified ? Yes No Plant Investigation Required

Comments :

By :

Date :

SUMMARY OPERATIONS :

Complaint Justified ? Yes No

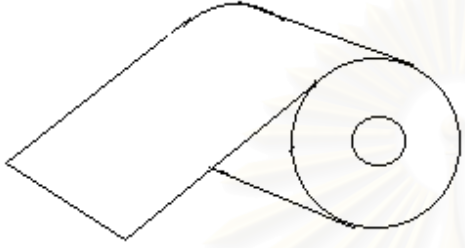
Comments :

By :

Date :

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CUSTOMER COMPLAINT-PRODUCT INSPECTION FORM

Customer : Location : Inspector :	Date :	Complaint No :
Coil Number :		
Product: <input type="checkbox"/> Zincalume <input type="checkbox"/> ZACS <input type="checkbox"/> CleanColorbond <input type="checkbox"/> PZACS <input type="checkbox"/> Truzinc <input type="checkbox"/> Other : End use:		
Drawing how defect is located		
		
Thickness : Width : Original coil weight :		
<input type="checkbox"/> Photo <input type="checkbox"/> Sample (Sample size 300mm. x width, one sample of unforming steel, one sample of forming steel.)		

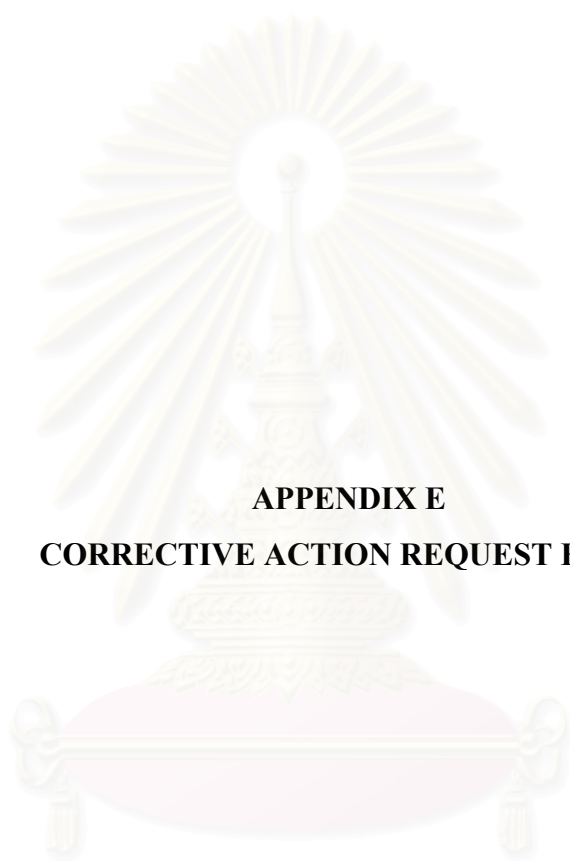
กรุณาอธิบายลักษณะ Defect คร่าว ๆ (Explain to defect appearance)
ตำแหน่งที่เกิดใน coil (Position/Distance of defect)
สภาพแวดล้อมเปียก? สารเคมี? โรงงาน? (Storage condition, Wet, Chemical, Industrial Area)
การขนส่ง + Packing OK? การติดตั้ง OK? (How's coil look like after delivery, Packaging, Installation)
ใช้หมดหรือยัง - เหลือเท่าไร (Defect tones, Coil Balance, Scrap)
ลูกค้าต้องการให้แก้ไขอย่างไร (What's client request to fix the problem)
ความคิดเห็นเพิ่มเติม (Additional Comment)



APPENDIX D
COMPLAINT UPDATE FILE

สถาบันวิทยบริการ
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TOTAL			3285.071							
Plant No	Product	Description	Quantity (kg)	Plant Date	Disposition	Customer	Delivery Date	Plant Name	Plant Status	Plant Number
02C001	TruZinc	prescratch	5.686	04-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1665
02C002	MCL-surplus	Wrong unit price	2.426	07-Jan-02	Sale co accept	Sale co	2/28/2002	Lek	Finished	85/1656
02C003	CCB	Wrong unit price	1.455	07-Jan-02	Sale co accept	Sale co	2/28/2002	Lek	Finished	85/1657
02C004	PZ	Wrong unit price	2.911	07-Jan-02	Sale co accept	Sale co	2/28/2002	Lek	Finished	85/1658
02C005	TZ	Wrong coil	3.355	08-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1664
02C006	PZ	Roll forming mark		08-Jan-02	un-accepted by plant	N/A	N/A		Finished	
02C007	CCB	Patin peel off & corrode		10-Jan-02	unaccepted	N/A	N/A		Finished	
02C008	ZL	uncoated	4.478	10-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1667
02C009	ZL	resin stain	0.21	10-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1690
02C010	TZ	undermass coil	2.57	16-Jan-02	Sale co accept	Sale co	2/28/2002	Suwat	Finished	85/1659
02C011	ZL	Wrong coil	2.911	16-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1668
02C012	TZ	White Rust	6.022	16-Jan-02	un-accepted by plant	N/A	N/A		Finished	
02C013	TZ	Darkening	5.568	16-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1673
02C014	Zacs	undermass coil	1.293	16-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1709
02C015	CCB	Wrong unit price	6.093	17-Jan-02	Sale co accept	sale co	2/18/2002	Kowit	Finished	
02C016	TZ	Darkening	4.56	18-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1669
02C017	TZ	Weight loss	2.887	18-Jan-02	TM Accepted	MCL	2/25/2002	Suchat	Finished	85/1687
02C018	P-Zacs RW	paint roll mark	20.868	18-Jan-02	Customer cancel				Finished	
02C019	ZL	peel off, Rust, back dot	32.05	17-Jan-02	Cancel				Finished	
02C020	ZL	Wrong unit price		22-Jan-02	Sale co accept	Sale co	1/22/2002	Yuttana	Finished	85/1670
02C021	ZL	Over quantity shipped for project proforma discou		22-Jan-02	Sale co accept	Sale co	1/23/2002	Yuttana	Finished	
02C022	ML-E	Uncoated	7.658	23-Jan-02	TM Accepted	MCL	2/19/2002	Suwat		85/1674
02C023	Zacs	Uncoated	4.568	23-Jan-02	TM Accepted	MCL	2/19/2002	Kowit		
02C024	ZL	Uncoated and pinholes	13.014	23-Jan-02	TM Accepted	MCL	2/19/2002	Kowit		85/1691



APPENDIX E
CORRECTIVE ACTION REQUEST FORM

สถาบันวิทยบริการ
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ใบแจ้งขอให้แก้ไขสิ่งที่ไม่สอดคล้องกับข้อกำหนด

CORRECTIVE ACTION REQUEST (CAR)

หมายเลข CAR (CAR Number) : MKT-

ส่วนที่ 1: รายละเอียดทั่วไป และความไม่สอดคล้อง (Nonconformity detail)

ส่วนงานที่พบความไม่สอดคล้อง(NC-area)

ความไม่สอดคล้อง(nonconformity)

รายละเอียดความไม่สอดคล้อง (nonconformity detail)

Complain no. 02CM

วันที่แจ้ง(date)

/2002

วันที่รับแจ้ง(date)

ผู้แจ้ง(informer)

ผู้รับแจ้ง(receiver)

ส่วนที่ 2 การหาสาเหตุ,มาตรการแก้ไข /การป้องกันของความไม่สอดคล้อง (root causes, correction, prevention determination)

สาเหตุของDefect/NC

ขั้นตอนจำเป็นในการกำจัดสาเหตุ

ผู้รับผิดชอบ

กำหนดเสร็จ

(Defect/NC Root cause)

(needed action for the elimination)

(Responsibility)

(due date)

Proposed by :

Review & Agreed by :

(Receiver)

(Informer or His / Her Head)

ส่วนที่ 3 การตรวจประเมินติดตามผลปฏิบัติการแก้ไข และการปิด CAR (Follow up assessment and CAR closed)

สิ่งที่ตรวจประเมิน

(Assess result)

พบว่ามาตรการแก้ไขและปฏิบัติ

[] มีประสิทธิผล จึงให้สรุปปิด CAR ได้(correction is effective/CAR closed)

(correction resulted)

[] ไม่มีประสิทธิผล จึงให้ทำซ้ำตาม Procedure(correction is noneffective /repeat rocedure)

ผู้ตรวจประเมิน

วันที่(date)

(Assessor)



APPENDIX F
PRODUCTION RECORDS

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

EXIT INSPECTION REPORT

DATE	
SHIFT	
REPORT BY	
TEAM LEADER	

ITEM	INPUT DATA							OUTPUT DATA					INSPECTION DATA			STATUS COIL	NEXT PROCESS	COMMENTS	START COIL TIME	END COIL TIME
	COIL NUMBER	MASS (Tons)	THICK. (mm.)	WIDTH (mm.)	GRADE	PROD. ORDER	CUS. REQUIRE	COIL NUMBER	MASS (Tons)	LENGHT (m.)	LINE SPEED (m/min)	TOP COLOUR	BOTTOM COLOUR	BRAND Yes/No	INSPECTION RECORD SHAPE					
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
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21																				
22																				
23																				
24																				
25																				

MASS BY ORDER NO.

Pro. Order	Mass (Tons)
/	
/	
/	
/	
/	
/	

STATUS CODE

D : Down Grade N : Normal
 S : Scrap H : Hold
 P : Reprocess E : Second grade
 T : Slit

WEIGHT SCALE VERIFICATION

Time	STD Weight	Actual	Test by
	5548 +/-10 Kgs		

MESSAGE :

INPUT MASS =	TONS
OUTPUT MASS =	TONS
HOLD =	TONS
PBFI =	TONS
DOWN TIME =	MINS
LINE STOP =	TIME

สถาบันวิทยบริการ
 จุฬาลงกรณ์มหาวิทยาลัย

BIOGRAPHY

Mr Dechakom Boonma was born in 1975 in Bangkok, Thailand. He graduated in Metallurgical Engineering from Chulalongkorn University in 1997. He joined BHP steel (Thailand) Ltd since 1997. Now he is working as a technical marketing engineer.



สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย