



Chapter 5

Proposed Supplier Evaluation System

This chapter discusses in detail the new proposed systems for supplier evaluation. We will begin by discussing in sections 6.1 and 6.2 the principle and process of designing the new system. Details of the new evaluation system will be explained in subsequent sections

5.1 Philosophy and Objective

The new system is created to extend ABC's philosophy of customer satisfaction and quality to its suppliers and contractors who provide goods and /or services to ABC

Unlike the old system which simply measures only supplier's delivery and product quality. The new approach takes a more comprehensive view on what constitutes a good supplier. Service and pricing are added as other key factors to consider supplier's performance. Furthermore, the new system attempts to look beyond the output of suppliers' system (manifested in the form of product quality, delivery, price, etc.) and extends the view to cover supplier's internal quality process, its potential and commitment to quality. An audit is thus added as an integral part of the evaluation system to verify if suppliers' facility, capability, management and quality systems really meet our company's requirements.

As for objective, the new system is designed to overcome the previous system's shortcomings as discussed in section 3.10. In short, the Company's objective is

1. To construct an evaluation system that is accurate in reflecting suppliers' performance based on the Company's present requirements.
2. To have a system that does not only measure supplier's performance, but also helps encourage them to improve.
3. To have an evaluation system whose results of assessment can be used in the company's buying decisions and policy.
4. To have a system that supports long-term commitment and relationships from suppliers.

5.2 People Involved in design of the new system

Supplier' performances and products provided by them affect the work of several departments. As a result, participation from all concerned departments was required in designing the new system. Moreover, getting all concerned people together make them feel the owner of the system. Taking part in the design process will also create a joint agreement, which helps to make the assessment results easily accepted by all parties. Following are people who took part in this design process.

1. Purchasing Manager who will be the direct user of the system
2. Production Manager and key supervisors who are the users of purchased materials
3. R&D Manager who will be responsible for setting technical specifications of key materials
4. Factory Manager who will be responsible for the overall performance of the plant

The author took part as the representative from Administration Department and as the one who oversees overseas purchasing.

This design team will be referred to as "Supplier Evaluation System Design Team" later throughout this thesis

5.3 Concepts of the new system for supplier evaluation

The new system classifies suppliers into 3 classes based on result of the supplier performance evaluation. These three classes are **Approved, Certified, and Preferred** Quality levels. Different quality levels were designed to promote continuous growth in the areas of quality, delivery, service, and pricing. The rationale is to encourage suppliers to continuously improve their performance in order to maintain and increase the level of business with the Company.

Each quality level has specific performance criteria, which must be met before a supplier can progress to the next level. Suppliers will receive awards for performance growth. This is to encourage continuous improvement. The Preferred Level is the highest

quality performance level, which gives suppliers in this level special preference over others. The classification levels and awards are further defined in the following sections.

Figure 5.1 is the model of the new supplier evaluation system. As shown in the picture, the new system is comprised of two subsystems.

1. **A supplier Rating System** which measures a supplier's quality, delivery, pricing and service.
2. **A supplier Evaluation Audit** which evaluates a supplier's facility and its capabilities, its management practices, and its efforts in quality.

We will discuss about the supplier rating system in the next section, then followed by the Supplier Audit system.

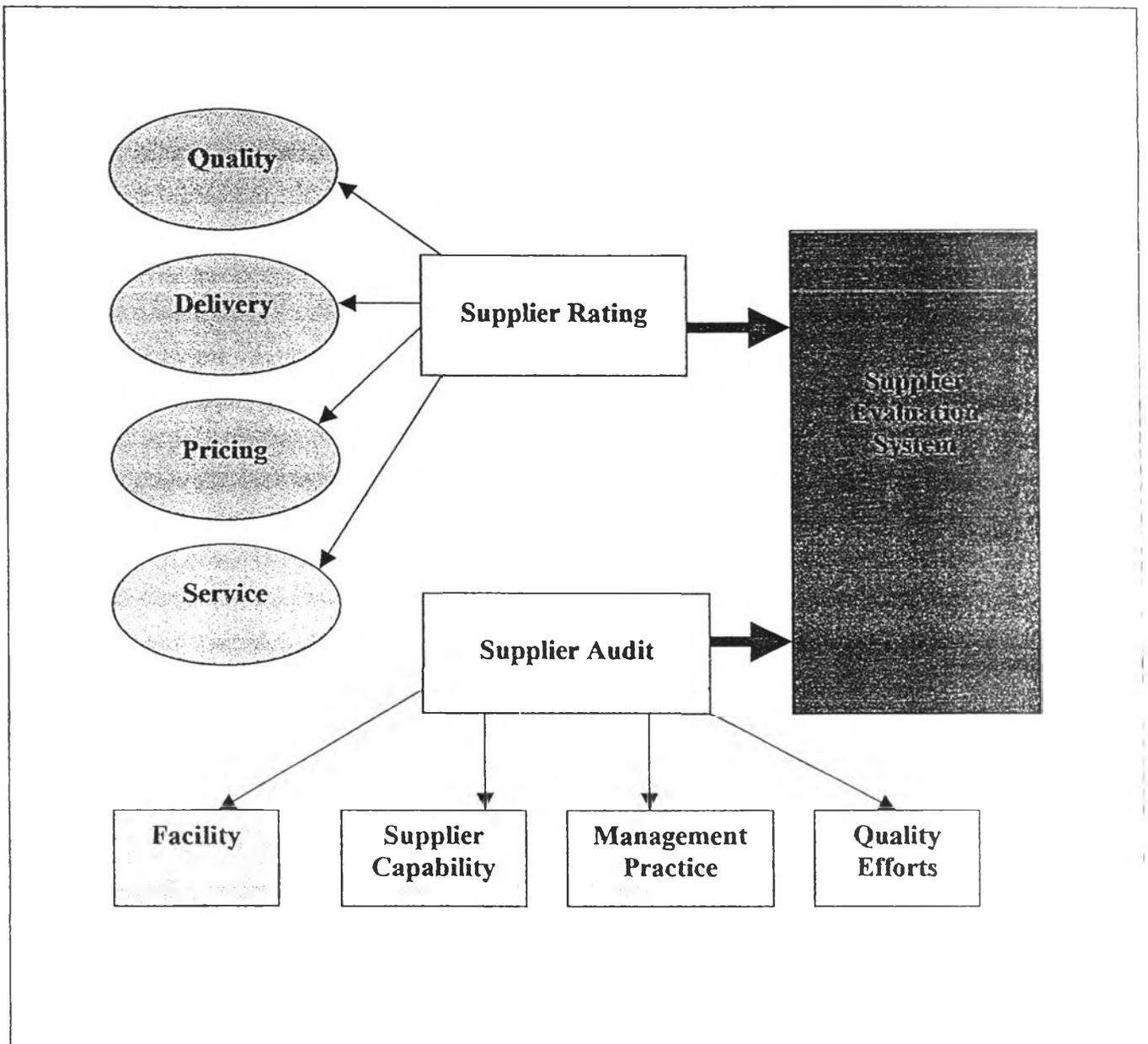


Figure 5.1 Diagram showing the new supplier evaluation system and its constituent elements

5.4 Supplier Rating System

As shown in Figure 5.1, the new evaluation system is comprised of 2 major parts, supplier rating system and supplier audit. The rating system is designed to measure the supplier's **product-related performance**, which is the quality viewed from the buyer's and user's perspective. This part of quality is measured by four factors which are **product quality, price, delivery, and service**.

These four major criteria were selected from the areas of concern the Company is having on its suppliers as explained in chapter 4. Because at the moment the company is primarily concerned with product quality and delivery, these two criteria are given highest weights. Pricing and service factors were also added to cover other important aspects of suppliers and make the assessment more comprehensive.

This section describes detail of the supplier rating part as to how the rating is done, and importantly what measures are used to rate suppliers and why they have been chosen.

5.4.1 Objectives of the rating system

The supplier rating system was developed to:

- 1 Rate supplier's overall performance in the areas of quality, delivery, price, and service to identify opportunity areas for improvements.
2. Encourage and reward suppliers who can demonstrate continuous growth
3. Coach and help supplier's quality to achieve the Preferred Supplier quality level which is the level where suppliers fully meet the Company's requirements
4. Share supplier's performance both within the company and outside the company

5.4.2 Criteria used in rating suppliers

The Supplier Evaluation System Design Team held a discussion to conclude what qualities should be sought from good suppliers. They concluded there are four major criteria ranked in order of importance as below.

1. **Quality of the Materials/ services provided:** Emphasis is placed on materials' conformance to specifications and returns due to defect. 40 points are given as the maximum possible points for this quality category.
2. **Delivery Performance:** On-time delivery, fulfillment of and compliance to purchase order. Maximum possible point is 28 for this area.
3. **Pricing:** pricing must be competitive. 12 points are the full mark for this category.
4. **Service:** Responsiveness to customer's needs and assistance in case of problems. Service is given 20 points as full mark.

It should be noted that the criteria to be used in measuring suppliers' performances and their relative importance are not based on any constant rule but rather selected based on the company's concern at that moment. The criteria used can be altered or modified in the future if the company's requirements have changed.

5.4.3 Measures and marks in the rating system

Having identified the four major quality category (price, delivery, pricing, and service) to measure a supplier, a series of measures/ questions were thought for marking suppliers in each category. Table 5.1 lists all the measures used in rating suppliers.

5.4.4 Forms used in supplier rating

The Supplier Evaluation Design Team has designed a number of forms to be used in supplier rating. These forms are shown in Appendix D.

Area of Concern	To be Rated By	Performance Measures	Details/ Explanation	Possible Maximum Mark
Quality	Production Manager, End User and/ or Quality Assurance/ Laboratory	• Conformance to specifications	• How close the materials are to company's specifications	15
		• Returns due to defect	• Percent of defects found after receipt of incoming material	10
		• Internal Quality Control	• Whether the supplier has quality manual and how is the content matched with our company's requirements	5
		• Safety Training Program	• Whether the supplier has a safety training program in place	5
		• Quality Training Program	• Whether there is a quality training program in place	5
Total Possible Marks for Quality Category				<u>40</u>
Delivery	Stock	• Quoted lead time	• How fast is the supplier's lead time compared to others providing the same materials	6
		• Fulfillment of order	• Quantity delivered compared to quantity ordered	7
		• On-time Delivery	• Percent of shipments on-time	12
		• Packaging	• Actual packaging V.S. spec	3
Pricing	Purchasing	• Price	• Pricing compared to	3

Table 5.1 Summary of performance measures used in the new supplier evaluation system

		Competitiveness • Change in price • Low bidder • Special Discount	other suppliers • New price compared to previous quotations • 3 extra points given to low bidder of one particular material • Whether the supplier offers special discount in case of early payments	3 3 3
Total Possible mark for Delivery & Pricing				<u>40</u>
Service	Users, Engineering Laboratory, Purchasing, and Accounting	• Responsiveness	• Responsiveness to problems, and readiness for on-site assistance	5
		• Job Performance	• Whether jobs are started and completed on-time	5
		• Accounting and Billing documents	• Correctness and legibility of related documents	5
		• Readiness for purchasing-related information	• How fast quotations are prepared and how in line are they with the our specifications	5
Total Possible Mark for Service				<u>20</u>
Financial Stability	Accounting	• Registered Capital • Credit Check	• No points for this criterion, but every supplier must meet satisfactory level.	-
Maximum Total mark for Supplier Rating				100

Table 5.1 Summary of performance measures used in the new supplier evaluation system (Continued)

5.4.5 Computation of Total Rating

After all quality categories have been marked, the scores are summed to attain total rating score as follows.

$$\text{Total Rating Score} = \text{Quality Mark} + \text{On-Time Delivery \& Price Mark} + \text{Service Level Mark}$$

Total rating mark attained will be used in conjunction with mark obtained from supplier audit to place suppliers in different classification levels. For a supplier to qualify for our Quality Classification levels, the overall rating score must be as follows:

80-100 qualifies a supplier for Preferred Level

70-80 qualifies a supplier for Certified Level

70-79 qualifies a supplier for Approved Level

It must be noted that achieving the rating score in these ranges is only the basic requirement for placing a supplier into a particular level. Aside from this rating score, the supplier must also meet other requirements and pass the audit for that level. Details of all criteria used in classifying suppliers will be discussed in section 5.6 and summarized in Table 5.4.

5.4.6 Frequency of Rating Review

How frequent a supplier is to be re-rated depends on the quality level it is in.

A. Approved/ Certified Supplier

All ratings will be sent to suppliers every six months (except for suppliers under performance monitoring). A supplier will be under performance monitoring if its performance has shown considerable decline to the level that creates concern. In these cases, the suppliers will receive the rating result every month.

B. Preferred Quality Suppliers

Preferred suppliers will re-assessed if there is a decline in performance for three consecutive months. If this happens, a Team appointed from the company will discuss with the suppliers to find out what has caused the performance deterioration. And if possible, the company will also try to help in setting improvement plan. In these cases, the suppliers will maintain their Preferred Supplier Level if they can correct the problems within six months and can maintain their performance at Preferred Level for three of the six months. Otherwise the Company may choose to place the supplier back to Certified Level or monitor its performance for one year.

C. New Suppliers

New suppliers will be evaluated within three to six months after a sample/ first production shipment is approved. Subsequent reviews will be in accordance with the terms mentioned above.

D. Low-volume supplier

The rating decision for suppliers that provide “one-time” service or product, or low-volume suppliers shall be according to the judgment of the SUPPLIER PERFORMANCE EVALUATION TEAM.

E. Uncommon Re-rating of suppliers

In certain cases, an out-schedule re-rating can be done.

- When there is clear evidence that the supplier is having serious quality problem.
- There are major changes in the supplier’s organization (for example, change in manufacturing facility or process, change in materials used, major change in the organizational structure, etc.)
- When the supplier’s performance drops below satisfactory level.

5.5 Supplier Audit System

The audit system is designed to assess the less obvious and intangible aspects of suppliers. Despite focusing on final product quality, it aims at the internal factors of suppliers that are believed to have effect on supplier's product quality and performance. For the new system, the team has concluded to focus on four aspects: **facility, capability, and management practice and quality efforts**. Areas to be audited are grouped into different categories as explained in the following table. Quality efforts are divided into two areas; quality management and quality assurance activities. Management practice is viewed in three critical areas which are material control, process control and system to support customer service. Table 5.2 lists all the topics to be examined in the audit.

Example of the forms used and more detail of each item can be found in Appendix D.

Category of Audited areas	Reasons/ Explanation	Audit Area
<p>Production Facility</p>	<ul style="list-style-type: none"> • To assess the supplier's production capability and its readiness in term of machinery and facilities required • To assess the supplier's capability to meet the company's requirements 	<ul style="list-style-type: none"> • Facility area and free area for expansion • Age of Building • Age of Equipment • Production Capacity • Normal Production Level
<p>Quality Management</p>	<p>To judge about the quality efforts demonstrated in all levels of management</p>	<ul style="list-style-type: none"> • Quality and productivity improvement program. • Emphasis on satisfying customer's needs and doing things right first time • Top management commitment • Published policy • Employees' awareness of quality policy • Training/ education • Use of statistical tools • Team approach • Housekeeping and safety practices
<p>Quality Assurance</p>	<p>To check if there are planned, systematic, and preventive actions which are necessary to ensure that material, product, and process conform to specified requirements</p>	<ul style="list-style-type: none"> • Control Manual • Formalized procedures/ work instructions • Documented system for controlling material/ equipment • Calibration schedule • Written procedures to monitor and control finished product • Written policy for disposition of defective finished products

Table 5.2 Summary of areas to be examined in the supplier audit

		<ul style="list-style-type: none"> • How defective items are dealt with • Internal Quality Audit
Material Control	To check the documented system to ensure the quality of incoming materials and services.	<ul style="list-style-type: none"> • Whether there is a formal Supplier Evaluation, selection and rating system • Whether supplier certification approval require before purchase • Process control for suppliers of critical materials • Supplier monitoring • Specifications of purchased materials. • Incoming inspection and record keeping • Identification/ traceability of materials to test/report • Procedure to deal with nonconforming materials • Procedure to deal with the disposition of nonconforming material
Process Control	To ensure process are controlled and capable of producing quality products/ services	<ul style="list-style-type: none"> • Written diagram showing the manufacturing process/ administrative sequence • Process control • Identification of process status • Documentation of process change • Communication of change in process with the customer
Internal system supporting customer service	To check whether the supplier' internal system supports good service to customers.	<ul style="list-style-type: none"> • Record kept showing compliance with customer's shipping and handling requirements. • Product inspection prior to packaging or shipping • Verification for compliance to purchase order before shipping • System to monitor delivery performance

Table 5.2 Summary of areas to be examined in the supplier audit (Continued)

		(of the supplier's own) <ul style="list-style-type: none"> • Improvement on delivery performance • System to deal with customer's concerns/ complaints
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Table 5.2 Summary of areas to be examined in the supplier audit (Continued)

5.5.1 Conducting the Audit

An audit can be done in two ways.

On-site audit: A Team consisting of representatives elected from concerned departments will go in the supplier's facility to conduct the audit.

Self assessment: For Preferred suppliers who can maintain their Preferred status for more than one continuous year, suppliers that are located abroad, the QA manager may decide to conduct the audit by phone or accept self-assessment from suppliers.

5.5.2 Forms used in supplier audit

Forms/ Questionnaires to be used in supplier audit are shown in Appendix D.

5.5.3 Computation of Audit Score

After the audit has been conducted, score can be computed using the following formula.

$\text{Total Audit Score} = \text{Quality Management Mark} + \text{Possible Quality Assurance Mark} + \text{Possible Material Control Mark} + \text{Process Control Mark} + \text{Customer Service Mark}$

Maximum Possible Score = Sum of maximum scores for all questions – sum of maximum scores of questions answered N/A

% Attained = Total Audit Score / Maximum Possible Score

The percent attained from audit will be used in conjunction with rating score to classify suppliers.

70%-80% qualifies a supplier for Approved Supplier Level

81%-90% qualifies a supplier for Certified Supplier Level

91%-100% qualifies a supplier for Preferred Supplier Level

5.6 Definitions and Detail of Suppliers in Each Level

This section discusses detail about suppliers in each quality level and some requirements other than the rating score and audit score.

Level 1: Approved Supplier

All new suppliers must be approved before doing business with ABC. After a supplier has been approved, it would be added to the company's Approved Supplier List.

Suppliers must be audited by Purchasing and/ or Quality Assurance/ Lab before they become Approved Suppliers. This audit can be done in two ways, by telephone and/ or on-site, depending on the type and quantity of material being considered for use. All suppliers must complete a Supplier Evaluation Audit Form and return it to the Company. The type and date of audit conducted will be determined by Purchasing and the Lab (R&D department).

Requirements for Approved Quality Level

- **Financial Stability**

To do business with ABC, a supplier must have an accounting rating of satisfactory or better. The company's new policy is to deal with financially stable company only.

- **Quality Program**

Suppliers must have a formal quality program in place. This includes a quality manual and a formalized quality-training program for employees.

- **Rejection Rate**

Supplier's acceptance level must not drop below 90% acceptance for 12 consecutive months.

- **On-Time Delivery**

Supplier's On-Time Delivery rate must be greater than 70 percent for 12 consecutive months. (On-time Delivery = the date mutually agreed upon by the buyer and supplier that material will arrive or the date the service will begin). However, this does not apply MMA which is the most crucial material for production. For MMA, 100 percent on-time delivery is expected.

- **Supplier Rating and Audit Score**

A supplier must obtain rating score between 61-70 and audit score of 70%-80% to be classified as Approved Supplier.

- **For New Suppliers**

Any supplier that either introduces a new product or supplies an approved product(s) will be given six months to establish a performance history. Upon completion

of the six months, the supplier will be evaluated against the previously mentioned criteria. If all the criteria are met, they will be added to ABC's **Approved Supplier list (APL)**

Level II: Certified Supplier

Certified Supplier is the second level. Certified Suppliers are given higher preference over those in approved levels. In addition, the Company has a policy to fully support and assist suppliers in Certified Level to become Preferred Suppliers.

Requirement for a supplier to reach Certified Quality Level

Before a supplier can become a Certified Supplier for ABC, all the criteria of Level I, Approved Supplier, must be met and the following improvements must be demonstrated.

- **Rejection Rate**

Supplier's acceptance level must not drop below 94% acceptance for 12 consecutive months.

- **On-Time Delivery**

Supplier's On-Time Delivery rate must be greater than 85 percent for 12 consecutive months.

- **Supplier Rating and Audit Score**

For a supplier to qualify for the Certified Level, it must attain

71-80 points rating score and 81% to 90% mark from the audit

- **For New Suppliers**

A supplier must have 12 months documented history with ABC and meet all the above criteria before being considered for this level.

Level III: Preferred Supplier

This is the highest level a supplier can achieve. When a supplier has achieved this level, it has demonstrated its capability and commitment to providing quality products/services. The Company therefore gives the following incentives for suppliers who could reach this Preferred Level

- Single-source procurement
- Consideration for long-term contract
- Preference over Approved and Certified Levels for any agreement/partnership

Requirements for Preferred Level

Before a supplier can become a Preferred Supplier for ABC, all the criteria of Level II, Certified Supplier, must be met with the following improvements.

- **Rejection Rate**

Supplier's acceptance level must not drop below 97 percent acceptance for 12 consecutive months

- **On-Time Delivery**

Supplier's on-time delivery rate must be greater than 95 percent for 12 consecutive months.

- **Supplier Rating and Audit Score**

For a supplier to qualify for the Certified Level, it must attain

80-100 points rating score and 90%-100% mark from the audit

- **For New Supplier**

A supplier must have 12 months documented performance history with ABC before being considered for the Preferred Level.

5.7 Definitions of On-time Delivery

Because on-time delivery is an important criterion for classifying suppliers, it is thus important to clarify its definition.

On-time delivery refers to the date which is agreed upon by ABC and the supplier that the goods will arrive at ABC's plant or any other agreed places for delivery. As for service, it is the date that both parties agreed the service will begin.

Purchasing will generate a monthly report, which depicts each supplier's delivery/Service Statistics.

The Rate of performance for each supplier on this On-Time Delivery aspect is measured by the date material was actually received against the date the material was promised and/ or that date a contractor/ service provider actually start the service against the date that was mutually agreed upon.

Allowance given for on-time delivery is 2 days late or 5 days early. Material will not be considered late if it is received two days after the promised date. The two days are the period allowed for shipping delays. Early shipments are measured the same as nonconformance. Shipments received five days prior to the Purchase Order promised date are acceptable as on-time shipments. Shipments six days or earlier are considered nonconformance to the "On-Time Delivery" element.

There are no special parameters for services, they must start the date they were mutually agreed upon.

5.8 Summary of Suppliers in Each Quality Level

From discussion about supplier rating and audit so far, all the criteria used in classifying supplier are summarized in Table 5.4 below.

Criteria	Approved Supplier	Certified Supplier	Preferred Supplier
Financial Stability	Must be rated "satisfactory"	Must be rated "satisfactory"	Must be rated "satisfactory"
Quality Program	Must have a quality program in place	Must have a quality program in place	Must have a quality program in place
Rejection Rate	>90% for 12 consecutive months	>94% for 12 consecutive months	>97% for 12 consecutive months
On-time Delivery	>70% for 12 consecutive months	>85% for 12 consecutive months	>95% for 12 consecutive months
New Suppliers	Must have at least 6 months history with the company	Must have at least 12 months history with the company	Must have at least 12 months history with the company
Supplier Rating Mark	61-70	71-80	81-100
Supplier Audit Mark	71%-80%	81%-90%	91%-100%
Frequency of Review	Every 6 months*	Every 6 months*	Every 6 months*

Table 5.3 Summary of the three classification levels for suppliers

Note *Except for suppliers under performance monitoring. For these suppliers, performance will be reviewed and reported monthly until their performance has returned to the previous level.

5.9 Review and Validation of Rating Scale

In deciding about the scale range to divide suppliers in each classification level, one question arose as to whether the scale range set for each level is appropriate. In other

words, whether a supplier falling into one particular classification level should really be in that level.

To check the validation of these scale ranges, the Team chose at random five suppliers from the company's supplier base and rate these suppliers using the new proposed rating system (based on past performance). From the rating, one supplier fell into Preferred Level, two into Approved Level, and two fell into Certified Level. To verify whether the results were in line with the company's perception on these suppliers' performance, opinions from experts were sought. A Team consisting of the Factory manager, production manager, QA manager were asked to give opinions on the rating result. After discussion the Team agreed that the results were consistent with the company's perception and the rating scale is acceptable to be used in the initial stage. For the future, the rating scale can be adjusted to be more suitable after the system has been in use for a while and the company has sufficient performance records of suppliers. The company may look at the average and dispersion of suppliers' rating score to adjust the score range of each classification level to be more appropriate with the aid of statistical concept (For example, the company may decide how many percent top-performance suppliers should be called "Preferred", how many percent should be considered average and thus called "Certified" and 'Approved". Then using the mean and dispersion data of suppliers' score, the appropriate score range for each level can be set up on statistical ground)

5.10 Responsibility of each department on Supplier-Related Activities

The Supplier Evaluation Design Team also used this meeting opportunity to discuss clear definition of responsibilities each department should have on supplier-related activities such as selection of new supplies, etc. Table 5.4 is the summary from discussion.

Supplier-Related Activities	R&D and New Product Development	Purchasing	QA	Production
Define product requirements and required quality programs	<input type="checkbox"/>	◆	◆	
Select new suppliers	<input type="checkbox"/>	◆	◆	<input type="checkbox"/>
Assess Suppliers	◆	◆	◆	◆
Advice and jointly plan quality programs with suppliers		◆	◆	
Advice suppliers for quality improvement	◆	◆	<input type="checkbox"/>	
◆ Directly in charge <input type="checkbox"/> Partly in charge				

Table 5.4 Responsibility of each department in supplier-related issues