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Final-Report

UNIDO Contract: 90 / 004 / MK

Project No.: US / RAS / 88 / 182

"Regional Programme on Promotion of Industrialization through Standardization and Quality Control for ASEAN Countries"

30, January 1991

Japanese Standards Association
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1. Preface

With reference to the UNIDO Telefax dated 12 January 1990, Japanese Standards Association (JSA) was awarded the subcontract (No.90/004/MK) to execute the substantial part of the project: US/RAS/88/182. The services required for the subcontractor composes of two works: (1) Organization of a seminar on standardization and quality control in cooperation with Thai counterparts and (2) preparation of a volume of audiovisual training materials related to the same project.

Both of them have already been completed as scheduled in accordance with the Terms of Reference of the subcontract.

This final report describes the execution result of all of the duties including the evaluation of the activities.

2. Background Information

Standardization and quality control management are essential elements for all countries to realize industrialization and strengthen international competitiveness of their products by improved quality and productivity through rationalized production processes. Therefore, they are the areas of strategic importance on which a particular emphasis should be placed to promote industrial development.

Concerted efforts are required to develop and establish a well-functioning standardization and quality control structure and system which should entail, among other things, an organic link between national standards and quality control activities at the enterprise level.

It is general knowledge that Japan has become a leading industrial nation thanks to its ability to manufacture products of uniform quality and at low cost. This rise to industrial leadership has earned Japan its dramatic rate of economic growth and accounts for the worldwide attention focused on Japan.

Being well aware of the needs and importance of industrial development in a more integrated fashion for developing countries, UNIDO has been actively engaged in the promotion of programmes in the pertinent fields.
Joint technical assistance activities of UNIDO and Japan will contribute to accelerating the process of establishing an industrial base and infrastructure in the field of standardization and quality control in the developing countries.

3. Scope of Work

According to the Terms of Reference (Annex 1), the scope of work of the subcontract summarizes as follows:

A: Coordination and supervision of local authorities for provision of facilities and Thai counterparts
B: Preparation of working materials with specific information on the Japanese experience on the pertinent issues
C: Provision of five lecturers (experts) from Japan including their traveling and DSA costs
D: Preparation of a volume of audio-visual training materials
E: Provision of five supporting staff for the seminar organization, etc.
F: Logistics and technical services.

In addition to the above, for the seminar organization in Thailand in particular, the following provision of facilities is required in cooperation with TISI and local authorities.

- Conference room with sitting accommodations for 150 people
- Interpretation services (Japanese-English, Japanese-Thai)
- Translation of materials (Japanese-English)
- Photocopying services
- Typing or word-processing services (including secretaries or clerks)
- Microphones
- Audio-visual material: Projector, movie screen, video-tape player, etc.
- Tape recorders
- Podium for lecturers
- Registration desks and ID card distribution
- Catering services
- Hotel reservations
- Transportation services (Hotel - Conference location - Hotel)
- Miscellaneous services

It is to be noted that the preparation of audio-visual training material (video tape) is to be made not specially or exclusively intended for seminar use but for general use; promotional activities by UNIDO in the fields of standardization and quality control.

This point has been agreed upon between UNIDO's substantive section and the subcontractor at the beginning of project implementation.

4. Activities and Achievements

SEMINAR:

The programme was designed and the selection of lecturers was made taking into full consideration the following objectives set up in the project document.

- Making the Governments, the private sector, and, in general, the population aware of the significance and real meaning of standardization and quality control as support activities for their industrial development, the rationalization of production, import, export process which must be included in their policies and plans, strategies and programmes along with human and financial resources.
- Promoting and expanding the knowledge regarding practical techniques and means for standardization and quality control through the seminar.

In December 1989, two JSA staff fielded to Bangkok for advance preparation including negotiation with Thai authorities (TISI in particular) to confirm the respective roles in details for seminar organization.

The staff also visited Bangkok office of Japan External Trade Organization (JETRO) to call for and confirm their supports to complement the work to be made by TISI.

On this occasion, the details of the seminar programme were
finalized as shown below.

1) Title: Symposium on Industrialization through Standardization and Quality Control
2) Dates: 23rd.-25th. January, 1990 (3 days)
3) Venue: The Landmark Hotel and plaza, Bangkok
4) Invited: Thailand, Singapore, Philippine, Malaysia and Indonesia countries (Invitation was made through UNIDO Headquarters)
5) Expected number of participants: 150
6) List of textbooks prepared (Full text attached as Annex 4)
   ① Outline of industrial standardization and quality control
   ② Significance of standardization and quality control in the developing stage of the national economy
   ③ Standardization and quality control on factory management (I)
   ④ Standardization and quality control on factory management (II)
   ⑤ Total quality control
   ⑥ How to promote standardization and quality control by audio-visual

7). Schedule of the programme

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30-12:10</td>
<td>Opening Ceremony</td>
</tr>
<tr>
<td>10:10-10:40</td>
<td>Coffee break</td>
</tr>
<tr>
<td>10:40-10:50</td>
<td>Orientation</td>
</tr>
<tr>
<td>10:50-12:00</td>
<td>Outline of industrial standardization &amp; quality control</td>
</tr>
<tr>
<td>12:00-13:30</td>
<td>Luncheon</td>
</tr>
<tr>
<td>13:30-16:30</td>
<td>Significance of standardization &amp; quality control in the development of national economy</td>
</tr>
<tr>
<td>(15:00-15:15)</td>
<td>Coffee break</td>
</tr>
<tr>
<td>9:00-12:00</td>
<td>Standardization &amp; quality control on factory management (I)</td>
</tr>
<tr>
<td>(10:30-10:45)</td>
<td>Coffee break</td>
</tr>
<tr>
<td>12:00-13:30</td>
<td>Luncheon</td>
</tr>
<tr>
<td>13:30-16:30</td>
<td>Standardization &amp; quality control on factory management (II)</td>
</tr>
<tr>
<td>(15:00-15:15)</td>
<td>Coffee break</td>
</tr>
<tr>
<td>25</td>
<td>16:00-16:30</td>
</tr>
<tr>
<td>9:00-11:30</td>
<td>Total quality control in Japan</td>
</tr>
<tr>
<td>(10:30-10:45)</td>
<td>Coffee break</td>
</tr>
<tr>
<td>11:30-12:00</td>
<td>How to promote standardization &amp; quality control by audio visual</td>
</tr>
<tr>
<td>12:00-13:30</td>
<td>Luncheon</td>
</tr>
<tr>
<td>13:30-16:00</td>
<td>Panel discussion: Roles of standardization &amp; quality control to contribute strengthening constitution of enterprise and benefits expected</td>
</tr>
<tr>
<td>(15:00-15:15)</td>
<td>Coffee break</td>
</tr>
<tr>
<td>16:00-16:30</td>
<td>Closing ceremony</td>
</tr>
</tbody>
</table>
The number of participants of the seminar amounted to 150-200 for every day of the three consecutive sessions. All participants were observed to be attentive audience having interest in most of the subjects, and participation to the panel discussion was also active.

On the last day of the seminar, questionnaires (attached as Annex 2) which had been prepared in cooperation with TISI staff were distributed to the participants in order to collect their reactions and opinions about the seminar.

An evaluation report compiled in cooperation with TISI including analysis on the participants replies to the questionaire was attached as Annex 3.

VIDEO TAPE:

This video tape aims to introduce industrial standardization and quality control. In other words, its purpose is to make viewers feel industrial standardization and quality control is close to them and deepen their interest in quality improvement.

To make the video tape, a committee was newly established to make a full examination of the scope of the video. The chairman was professor Mukawa and its members were composed of specialists selected from among industrial and academic circles and government agencies, some of whom have experience as consultants in developing countries and also have taken part in the Thailand seminar as the lecturing staff.

To prepare video tapes primarily for teaching purposes, it is essential to explain in depth and detail the nature of the special field. Yet, industrial standardization and quality control covers a large number of items. It is therefore the general consensus of opinion that detailed explanation should be given after the viewer/listener has been made aware of the positioning of each of these many items within the whole. This recognition of the relative importance of each item as part of the whole of industrial standardization and quality control is the pre-condition upon which further penetration into the details of the subject must depend.

The contents of this video tape thus concentrate attention on the conveying of a proper understanding of the concepts and scope of
Industrial standardization and quality control.

The committee held its meeting 12 times over a half year and discussed the following points:
1. Examination of cases which can be specifically and intelligibly video taped, and
2. Examination of a scenario to develop a story of industrial standardization and quality control as a whole.

Repeated discussions of the above aspects led to a program based on the following six themes.
1. Introduction
2. Standardization
3. Built-in quality
4. Statistical method
5. P.D.C.A. cycle
6. QC circle

To enhance the effectiveness of these video tapes as a teaching aid, sub-text were prepared so that the viewer/listener would not miss the message even though he/she may have overheard or missed the narration.

The video tapes are available in all three video formats: VHS-SECAM, VHS-PAL and VHS-NTSC.
6. Remarks

SEMINAR:

One of the important factors for the success of this kind of seminar is to what extent the seminar contents meet the actual needs of the developing countries.

For the present seminar, JSA carefully selected the contents including lecturers based on its experience of more than 20 years organizing training courses, seminars and symposiums for the participant from developing countries.

This seminar was of more or less general and basic nature aimed at making the participants, both from the government and private sectors in various technical fields, aware of the significance and real meaning of standardization and quality control.

Therefore, there was some concern that the seminar contents might not fully satisfy those who had expected to be informed of more practical standardization and quality control methodology.

However, the participants' responses were very favorable as described in the evaluation report (Annex 2), and the seminar can be considered to have been very successful.

The industrialization in Thailand is now progressing at a more increased rate than in other developing countries, even in comparison with NIES. In this sense, this seminar organization was timely in Thailand where the interest to standardization and quality control has become higher. According to TISI which was responsible for the invitation of local participants, more than 50 late applicants had to be declined from participation overflowing the capacity although invitation period was rather short this time.

On the other hand, it should be emphasized that the success of a seminar largely depends upon the quality of cooperation given by local authorities.

In this respect, TISI's cooperation was very efficient, for which JSA would like to express its thanks to TISI.

This experience should be inherited to the seminar organizations in the future.
VIDEO TAPE:

The methods that are generally employed by Japanese companies to maintain high quality in an efficient manner have attracted interest throughout the world and have so far been highlighted and presented in various ways including publications and lectures. While there are many who have already acquired a knowledge of these methods in this manner, the practicalities of the matter can only be grasped through the powers of imagination. This makes it desirable to prepare teaching materials for video training, with various video tapes on the subject of quality control having already been prepared in Japan. Most of these video teaching materials, however, have been made primarily to meet the training needs of companies, and, unfortunately, they were not necessarily of nature capable of being made available to a wide circle in the developing countries.

The preparation of a video tape of this kind is crucially dependent on the cooperation of companies. On account of keeping secrecy, private companies are not always favorable to the public exposure by being taken pictures of it's manufacturing or production process closely related to quality control practices. However, this time, we could obtain to a certain extent possible the cooperation of manufacturers of automobile, iron and steel, stationary and home-electric appliances.

The positioning of these video tape as a teaching aid has already been made clear above and the theme, standardization and quality control, consists of a variety of factors, each of which is worthwhile to be independently mastered in depth. Following the present introductory version, it is therefore desirable that individual video tape should be prepared as independent units devoted to each of the following subjects or "items" and serialized.

1. Standardization
2. Quality assurance and Quality system
3. Statistical methods
4. Activity on QC circles
5. Total quality control
The idea of creating a teaching package that can be broken down into individual "volumes" each of which has an independent structure as have all the video tape and other volumes, and their arrangement within a well-balanced series will, surely, lead to a superior teaching material of a kind, the likes of which has not been available up until now.

Quality control, the supervision and assuring of quality, is the key to efficient production without unproductive wastefulness. The marketing of products of sustained high quality at low cost is bound to be welcomed also by the consumer. Nothing could be more desirable than the spread of this awareness and the propagation of this philosophy to generate economic growth in the developing countries.
TERMS OF REFERENCE FOR SUBCONTRACTING ORGANIZATION

INTRODUCTION

Standardization and quality control management are essential elements for the developing countries to achieve industrialization and strengthen international competitiveness of their products. They are the key to improving the quality and productivity by rationalizing production processes. In addition, they are a prerequisite to expanding overseas markets and promoting a smooth transfer of technology from the industrialized countries to the developing countries. Therefore, they are of strategic importance requiring special attention and emphasis.

While many developing countries are conscious of the importance of standardization and quality control, their experience in this field is still limited. Concerted efforts are required to develop and establish a well functioning standardization and quality control structure and system which should entail, inter-alia, an organic link between national standards and quality control activities at the enterprise level.

In this connection, the experience of Japan has shown this country has established a firm basis for industrialization through a systematic introduction of standardization and quality control techniques both at the national and enterprise level. Since the United Nations Industrial Development Organization (UNIDO) is approaching the problems of standardization and quality control in a more integrated fashion to ensure that technological development is linked to actual industrial production, joint technical assistance activities of Japan through the Ministry of International Trade and Industry (MITI) and UNIDO will contribute to accelerate the process of establishing an industrial base and infrastructure in the field of the standardization and quality control.

Promotion of these activities will start with a pilot seminar to be held in Thailand with 150 participants from the ASEAN countries, where the level of industrialization is at an appropriate stage, since the standardization and quality control are most effective when combined with other elements such as appropriate environment for investments, means of transportations and communications which are essential aspects of industrialization.

For the sake of co-ordination, the activities to be undertaken under this project will be subcontracted to a single institution which will be responsible for the efficient delivery of inputs and the adequate quality of outputs. In view that Japanese experience in the field of standardization and quality control will be transferred to developing countries, it is proposed to subcontract a Japanese organization to implement this project jointly with UNIDO.
PROJECT OBJECTIVES – OUTPUTS

The immediate objectives of the project are to establish a firm basis for the transfer of technology to the developing countries through strengthening support capabilities in the standardization and quality control which are the fundamental infrastructure of industrialization through:

- Making the Governments, the private sector, and, in general, the population aware of the significance and real meaning of standardization and quality control as support activities for their industrial development, the rationalization of the production, import, export process which must be included in their policies and plans, strategies and programmes along with human and financial resources;

- Promoting and expanding the knowledge regarding practical techniques and means for standardization and quality control through the seminar and the proper use of audio-visual training materials.

Output 1

Audio-visual training material for the transfer of practical techniques concerning standardization and quality control which will be utilized in a permanent basis by the countries and regional bodies with a multiplier effect.

Activities for Output 1

- The preparation of audio-visual training material to be distributed to each participant which will illustrate practical standardization and quality control techniques in visual way by the subcontracting institution;

- The preparation of a video tape in English and Thai (in the three different international systems PAL, SECAM, NTSC) which will be sent to UNIDO for promotional purposes.

Output 2

150 middle-class managers (may be Government officials, executives, managers and engineers of enterprises) who are directly responsible for promoting and implementing standardization and quality control will receive practical and direct recommendations, envisaged by experiences in Japan, towards the solutions of problems that they are facing in order to strengthen their competitiveness. (Roughly 150 participants to the seminar are expected.)

Activity for Output 2:

- The seminar will be held in Thailand from 23 - 25 January 1990 and will be sponsored by UNIDO in co-ordination with the Government of Japan. The seminar is to promote and to transfer the techniques of standardization and quality control towards middle-class managers in Thailand and ASEAN countries, who are responsible for promoting the standardization and quality control in enterprises. Lectures will be presented in English, Thai and Japanese. (Text will be in English)
SCOPE OF WORK BY SUBCONTRACTING ORGANIZATION

A - The subcontracting organization will be directly responsible for coordinating and supervising local authorities for provision of facilities and Thai counterparts.

B - Preparation of working material, to be mailed 2 weeks in advance to the 150 participants, with specific information on the Japanese experience on promoting a firm basis for industrialization through standardization and quality control techniques.

C - Five lecturers (experts) from Japan, selected according to project objectives and programme (see attached schedule), qualified to promote the importance of rationalizing production processes in developing countries through standardization. The subcontractor must provide traveling and DSA costs.

D - Preparation of a volume of audio-visual training material, including a video tape in three international systems (PAJ, SECAM, NTSC). There will be a specific lecture in the seminar on the utilization of this material on a permanent basis, by Government and regional bodies in developing countries, to support their industrialization efforts through the transfer of Japanese technology, know-how and experience in this field.

E - Travelling and DSA costs for five persons as supporting staff, which could be divided as follows:

- Two persons to concentrate on advance preparations, including negotiations with Thai authorities.
- Three persons to support direct seminar activities.

F - Logistics and technical services, assuring availability of local administrative support personnel.

FACILITIES TO BE PROVIDED BY SUBCONTRACTING ORGANIZATION IN CO-ORDINATION WITH TISI AND LOCAL AUTHORITIES

- Conference room with sitting accommodations for 150 people
- Interpretation services (English - Japanese)
- Translation of materials (English - Japanese)
- Photocopying services
- Typing or word-processing services (including secretaries or clerks)
- Microphones
- Audio-visual material: Projector, movie screen, video-tape player, etc.
- Tape recorders
- Podium for lecturers
- Registration desks and ID card distribution
- Catering services
- Hotel reservations
- Transportation services (Hotel - Conference location - Hotel)
- Miscellaneous services
EVALUATION

A report (5 - 10 pages) on the outcome of the seminar (with the organizer's point of view) that will help UNIDO - MITI evaluate the results of this pilot project must be submitted by the sub-contractor within two weeks after the conclusion of the seminar.
Questionnaire for the Seminar on Industrialization
through Standardization and Quality Control

In order to improve the next seminars on standardization, we would like to have your opinions and suggestions about this seminar.

Please fill the questionnaire and return it to our staff before 3.00 p.m. (before coffee break)

Thank you for your cooperation.

Details of Informer

- Government and State Enterprises
- Private Sectors
- Tiles and Sanitary Appliances
- Textiles
- Electric Cables and Conductors
- Paints and Chemical Products
- Iron, Steel and Metal Products
- Foods
- Plastics and Non-Ferrous Materials
- Concrete and Construction Materials
- Medical Equipments and Cosmetics
- Mechanics and Vehicles
- Electric Appliances
- Others (Specify).............................

Background knowledge in standardization and quality control

- a. much
- b. some
- c. none
Please tick / and fill your suggestion on each item

Content of the Seminar:

1. Degree of satisfaction of the topics included in this seminar.
   a. much   b. fair  c. not satisfied

2. Degree of interest in the following topics
   much  fair  little

1. Significance of standardization & quality control in the development of national economy  a  b  c

2. Standardization & quality control on factory management (I)  a  b  c

3. Standardization & quality control on factory management (II)  a  b  c

4. Total quality control in Japan  a  b  c

5. How to promote standardization & quality control by audio visual  a  b  c

3. Degree of sufficiency and relevancy of the documents distributed in this seminar.
   a. much   b. fair  c. not satisfied

4. Comprehensibility of the distributed documents  a. much   b. fair  c. not satisfied

Comments

Lecturers:

5. Ability in presentation such as explanation, sequence etc. (in general).
   a. much   b. fair  c. not satisfied

6. Ability in answering the question (in general).
   a. much   b. fair  c. not satisfied

Comments
Interpreters:

7. Fluency in interpreting

<table>
<thead>
<tr>
<th></th>
<th>much</th>
<th>fair</th>
<th>little</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese - Thai</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>Japanese - English</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
</tbody>
</table>

8. Ability in interpreting

<table>
<thead>
<tr>
<th></th>
<th>much</th>
<th>fair</th>
<th>little</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese - Thai</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
<tr>
<td>Japanese - English</td>
<td>a</td>
<td>b</td>
<td>c</td>
</tr>
</tbody>
</table>

Comments


Arrangement:

9. Degree of satisfaction on the following items.

- Period of seminar (3 days)
- Venue (e.g., seminar room, hotel)
- Number of participants
- Atmosphere (e.g., light, noise)
- Audio visual aids
- Reception and Orientation
- Hotel Service

10. Advance information about the seminar.

<table>
<thead>
<tr>
<th></th>
<th>a. sufficient</th>
<th>b. insufficient</th>
</tr>
</thead>
</table>
11. Your source of information about the organization of the seminar.

- Invitation by TISI

- Mass media

- Individuals

- Others (specify) ........................................

Comments ................................................................

.................................................................
Evaluation of the Seminar

on

Industrialization through Standardization

and Quality Control

During 23rd - 25th January 1990

At the Landmark Hotel and Plaza, Bangkok, Thailand

1. Introduction
2. Details of participants
3. The findings about the Seminar
   3.1 on the content
   3.2 on the lecturers
   3.3 on the interpreters
   3.4 on the management
4. Analysis on the findings
Evaluation of the Seminar on Industrialization through Standardization and Quality Control During 23rd - 25th January 1990 At the Landmark Hotel and Plaza, Bangkok, Thailand

1. Introduction

This study attempts to evaluate the seminar on industrialization through standardization and quality control held by United Nations Industrial Development Organization (UNIDO) and Ministry of International Trade and Industry (MITI), Japan, organized by Japanese Standards Association (JSA), co-operated by Japan External Trade Organization (JETRO), Bangkok and hosted by the Thai Industrial Standards Institute during 23rd - 25th January 1990 at the Landmark Hotel and Plaza, Bangkok. As the target of the Seminar, 150-200 participants from government agencies and private sectors were expected and the invitation to the head of 30 government agencies and managers of 300 companies (mostly from list of TISI licensees) was sent one month in advance (21 December 1989). All lectures were given in Japanese with simultaneous interpretation into Thai and English. The documents were in English only and distributed day by day.

Questionnaires were instrumental to the evaluation of this Seminar. The questionnaires were devised in Thai for local participants and in English for participants from other ASEAN countries (i.e., Indonesia and Malaysia) or local participants who may not speak Thai. Questions included in the questionnaires are on content of the seminar including documents distributed during the seminar, lecturers, interpreters and management as well as service in general. It should be noted that the numbers of participants were not regular during the 3-day seminar. The actual numbers of participants per day are as follows.

First day (23-1-90) - 210 participants
Second day (24-1-90) - 197 participants
Third day (25-1-90) - 165 participants
One hundred and sixty-five questionnaires were circulated among participants on the last day of the seminar and 153 filled copies (92.73%) were returned. Among the received questionnaires, 1 copy (0.61%) was incomplete and could not be used. Only 152 copies (99.35%) were used in the evaluation. Frequency distribution, percentage distribution and descriptive method were applied for the analysis. It was anticipated that the findings would supply some data for the improvement of the next seminar. The findings are as follows:

Details of participants

In the questionnaires, the participants were classified by their occupations into 2 categories; i.e., government officials (including state-enterprise employees) and employees of private sectors. For those who come from private sectors, an indication of the types of products produced by their companies was additional. The details on information on occupation, types of products and background knowledge, source of information about the seminar and the time in advance when they learned about the seminar are as follows (Tables 1-5).

Table 1
Occupations of participants

<table>
<thead>
<tr>
<th>Occupation</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government officials and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>state-enterprise employees</td>
<td>56</td>
<td>36.84</td>
</tr>
<tr>
<td>Private sector employees</td>
<td>92</td>
<td>60.53</td>
</tr>
<tr>
<td>No information</td>
<td>4</td>
<td>2.63</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 2

Participants from private sectors classified according to types of products produced by the companies to which they belong

<table>
<thead>
<tr>
<th>Types of products</th>
<th>No. of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiles and sanitary appliances</td>
<td>2</td>
</tr>
<tr>
<td>Textiles</td>
<td>1</td>
</tr>
<tr>
<td>Electric cables and conductors</td>
<td>4</td>
</tr>
<tr>
<td>Paints and chemical products</td>
<td>10</td>
</tr>
<tr>
<td>Iron, steel and metal products</td>
<td>16</td>
</tr>
<tr>
<td>Foods</td>
<td>14</td>
</tr>
<tr>
<td>Plastics and non-ferrous metals</td>
<td>6</td>
</tr>
<tr>
<td>Concrete and construction materials</td>
<td>3</td>
</tr>
<tr>
<td>Medical equipments and cosmetics</td>
<td>2</td>
</tr>
<tr>
<td>Mechanics and vehicles</td>
<td>8</td>
</tr>
<tr>
<td>Electrical appliances</td>
<td>19</td>
</tr>
<tr>
<td>Others</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>99</strong></td>
</tr>
</tbody>
</table>

**NOTE.** (1) The largest number of participants from private sectors, i.e., 19, deal with electrical appliances. Other products which were not specified in the questionnaires but mentioned by the participants are accessories of automobiles, glass wool insulations, consumer products, stationery, fertilizer, inspection and testing service, and non-identified product.

(2) It may be noticeable that there is irrelevancy between the number of participants in Table 2 and the number of employees from private sectors in Table 1. This is due to the fact that some participants indicated more than one type of products and some who did not indicate their occupations but mentioned their products were assumed as belonging to private sectors. Consequently, the finding cannot be calculated in percentage.
Table 3
Participants' background knowledge in standardization and quality-control

<table>
<thead>
<tr>
<th>Level of background knowledge in std. and Q.C</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much</td>
<td>25</td>
<td>16.45</td>
</tr>
<tr>
<td>Some</td>
<td>121</td>
<td>79.61</td>
</tr>
<tr>
<td>None</td>
<td>5</td>
<td>3.29</td>
</tr>
<tr>
<td>No information</td>
<td>1</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

It was found that the majority of the participants (79.61%) had some background knowledge in standardization while 25 participants (16.45%) have already had much background knowledge and only 5 (3.29%) had no background knowledge in standardization at all.
Table 4
Advance information about the seminar

<table>
<thead>
<tr>
<th>How long before the seminar were the participants informed about its arrangement?</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficient</td>
<td>126</td>
<td>82.90</td>
</tr>
<tr>
<td>Insufficient</td>
<td>25</td>
<td>16.45</td>
</tr>
<tr>
<td>No information</td>
<td>1</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>152</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

According to the questionnaires, most participants; i.e., 82.90%, indicated that they were informed in advance and had sufficient time, whereas, 16.45% mentioned insufficient time.
Table 5  
Source of Information

<table>
<thead>
<tr>
<th>Source of Information</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invitation by TISI</td>
<td>108</td>
<td>71.05</td>
</tr>
<tr>
<td>Mass media</td>
<td>6</td>
<td>3.95</td>
</tr>
<tr>
<td>Individuals</td>
<td>22</td>
<td>14.47</td>
</tr>
<tr>
<td>Others</td>
<td>14</td>
<td>9.21</td>
</tr>
<tr>
<td>No information</td>
<td>2</td>
<td>1.32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>152</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

It was found that most informants; i.e., 71.05% were invited by TISI, 14.47% were informed by individuals, 3.95% learned about the seminar from mass media and 9.21% got the information from other sources; i.e., from their chiefs (managing director), organizers, Japanese side, the Federation of Thai Industries, other colleagues, UNIDO, and by a circulated memo.
The findings on the seminar are as follows:

1. On the Content

1.1 Degree of satisfaction of the topics included in the seminar

The finding is revealed in Table 6.

<table>
<thead>
<tr>
<th>Degree of satisfaction</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much</td>
<td>31</td>
<td>20.39</td>
</tr>
<tr>
<td>Fair</td>
<td>92</td>
<td>60.53</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>18</td>
<td>11.84</td>
</tr>
<tr>
<td>No. information</td>
<td>11</td>
<td>7.24</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

It is evident that the majority of participants (60.53%) had fair satisfaction with the topics included in this seminar while 20.39% were highly satisfied. Only few (11.84%) were not satisfied.
1.2 **Degree of Interest in specific topics**

The degree of interest is illustrated in Table 7.

**Table 7**

Degree of interest in specific topics

<table>
<thead>
<tr>
<th>Degree of interest in each topic</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topics:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Significance of standardization and quality control in the development of national economy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>86</td>
<td>56.58</td>
</tr>
<tr>
<td>Fair</td>
<td>62</td>
<td>40.79</td>
</tr>
<tr>
<td>Little</td>
<td>1</td>
<td>0.66</td>
</tr>
<tr>
<td>No information</td>
<td>3</td>
<td>1.97</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td>2. Standardization &amp; quality control on factory management (I)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>93</td>
<td>61.18</td>
</tr>
<tr>
<td>Fair</td>
<td>49</td>
<td>32.24</td>
</tr>
<tr>
<td>Little</td>
<td>5</td>
<td>3.29</td>
</tr>
<tr>
<td>No information</td>
<td>5</td>
<td>3.29</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td>3. Standardization &amp; quality control on factory management (II)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>96</td>
<td>63.16</td>
</tr>
<tr>
<td>Fair</td>
<td>48</td>
<td>31.58</td>
</tr>
<tr>
<td>Little</td>
<td>3</td>
<td>1.97</td>
</tr>
<tr>
<td>No information</td>
<td>5</td>
<td>3.29</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 7 (cont'd)

<table>
<thead>
<tr>
<th>Degree of interest in each topic</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Total quality control in Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>89</td>
<td>58.55</td>
</tr>
<tr>
<td>Fair</td>
<td>53</td>
<td>34.87</td>
</tr>
<tr>
<td>Little</td>
<td>4</td>
<td>2.63</td>
</tr>
<tr>
<td>No information</td>
<td>6</td>
<td>3.95</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td>5. How to promote standardization &amp; quality control by audio visual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>87</td>
<td>57.24</td>
</tr>
<tr>
<td>Fair</td>
<td>51</td>
<td>33.55</td>
</tr>
<tr>
<td>Little</td>
<td>6</td>
<td>3.95</td>
</tr>
<tr>
<td>No information</td>
<td>8</td>
<td>5.26</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Five topics were dealt with in the Seminar. In general, all specific topics were found to be very interesting by the participants; the third topic ranks firstly, followed by the second, the fourth, the fifth and the first.
1.3 Sufficiency and relevancy of the distributed documents

The finding is indicated in Table 8.

Table 8

Sufficiency and relevancy of the distributed documents

<table>
<thead>
<tr>
<th>Degree of sufficiency and relevancy</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much</td>
<td>35</td>
<td>23.03</td>
</tr>
<tr>
<td>Fair</td>
<td>99</td>
<td>65.13</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>15</td>
<td>9.87</td>
</tr>
<tr>
<td>No information</td>
<td>3</td>
<td>1.97</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Most participants; i.e., 65.13% were of the opinion that the documents distributed during the seminar were fairly sufficient (in number and in content) and relevant, and 23.03% found them very sufficient and relevant.
1.4 Comprehensibility of the distributed documents

The finding is shown in Table 9.

Table 9

Comprehensibility of the distributed documents

<table>
<thead>
<tr>
<th>Comprehensibility of the distributed documents</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much</td>
<td>21</td>
<td>13.82</td>
</tr>
<tr>
<td>Fair</td>
<td>118</td>
<td>77.63</td>
</tr>
<tr>
<td>Little</td>
<td>6</td>
<td>3.95</td>
</tr>
<tr>
<td>No information</td>
<td>7</td>
<td>4.61</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The majority of participants; i.e., 77.63%, found the distributed documents fairly comprehensible. Twenty-one or 13.82% found them easy to understand and 3.95% found them hard to understand.
Comments on the content of the seminar

1. The documents should be both in English and in Thai.

2. The following details should be added: specific content, Q.C. and T.Q.C. processes, problems which may be encountered in Q.C. implementation and their solutions, implementation method of T.Q.C. applicable to Thailand, and techniques to encourage the staff of a company to join Q.C. activities.

3. The documents should be relevant to the lecture, the levels of the participants should be taken into account, and deal with some specific types of products and the implementation or practical techniques.

4. For the purpose of comparative study, local companies which have been successful in Q.C.C. and T.Q.C. should also be invited to join lectures.

5. The slides of item 5 were interesting and should be prepared in Thai. They can be produced as T.V. programme.

6. All documents for the 3-day seminar should be distributed to the participants in advance so that the advance study is possible and participants can get ready for questions.

7. Some topics in the documents were too short/too general.

8. Technical aspect was not emphasized.

9. The documents were rather incomplete as regard picture, graph, drawing, and calculation method.

10. With little background knowledge coupled with the problem of language communication, the seminar was rather difficult to understand.
2. On the lecturers

2.1 Ability in presentation

The finding is given in Table 10.

Table 10
Lecturers’ ability in presentation

<table>
<thead>
<tr>
<th>Lecturers’ ability in presentation</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much</td>
<td>47</td>
<td>30.92</td>
</tr>
<tr>
<td>Fair</td>
<td>90</td>
<td>59.21</td>
</tr>
<tr>
<td>Little</td>
<td>9</td>
<td>5.92</td>
</tr>
<tr>
<td>No information</td>
<td>6</td>
<td>3.95</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

30.92% of the participants were of the opinion that the lecturers had high ability in presentation. The majority of the participants (59.21%) were of the opinion that the lecturers had fair ability in presentation.
2.2 Ability in answering the questions

The finding is presented in Table 11.

<table>
<thead>
<tr>
<th>Lecturers' ability in answering</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much</td>
<td>30</td>
<td>19.74</td>
</tr>
<tr>
<td>Fair</td>
<td>73</td>
<td>48.03</td>
</tr>
<tr>
<td>Less, little</td>
<td>6</td>
<td>3.95</td>
</tr>
<tr>
<td>No information</td>
<td>43</td>
<td>28.29</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Most participants (48.03%) found that the lecturers had fair ability in answering the questions; 19.74% were of the opinion that the lecturers had much ability.
Comments on the lecturers

1. The lectures should be in English.
2. The lecturers are experts with high experience and are very nice.
3. The lecturers spoke too fast. If they spoke more slowly, the interpreters might be able to convey more content. Moreover, the difference of languages used in communication took time in translation and might cause some errors or misunderstanding.
4. The lecturers intended to cover a large content but the time was limited, so, the sequence of their presentation seemed to be rather confusing.
5. Some answers were not direct to the point or answer the questions.
3. On the interpreters

3.1 Fluency in interpretation

The finding is given in Table 12.

Table 12
Interpreters' fluency in interpretation

<table>
<thead>
<tr>
<th>Fluency</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Japanese-Thai</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>13</td>
<td>9.70</td>
</tr>
<tr>
<td>Fair</td>
<td>81</td>
<td>60.45</td>
</tr>
<tr>
<td>Little</td>
<td>40</td>
<td>29.85</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>134</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Japanese-English</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>68</td>
<td>75.56</td>
</tr>
<tr>
<td>Fair</td>
<td>19</td>
<td>21.11</td>
</tr>
<tr>
<td>Little</td>
<td>3</td>
<td>1.97</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>90</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The total numbers of those who evaluated Japanese-Thai and Japanese-English are possibly overlapped because some participants might listen to both Thai and English and expressed their opinions in both questions. The fluency of Japanese-Thai interpreters was found by most participants (60.45%) to be fair, whereas the fluency of the Japanese-English interpreters was found by the majority (75.56%) to be high.
3.2 Ability in interpretation

The finding is illustrated by Table 13.

**Table 13**

Interpreters' ability in interpretation

<table>
<thead>
<tr>
<th>Ability</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Japanese-Thai</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>18</td>
<td>14.29</td>
</tr>
<tr>
<td>Fair</td>
<td>80</td>
<td>63.49</td>
</tr>
<tr>
<td>Little</td>
<td>28</td>
<td>22.22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>126</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Japanese-English</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>69</td>
<td>79.31</td>
</tr>
<tr>
<td>Fair</td>
<td>17</td>
<td>19.54</td>
</tr>
<tr>
<td>Little</td>
<td>1</td>
<td>1.15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>87</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Japanese-Thai interpreters were found by the majority of participants; i.e., 63.49%, to have fair ability in interpretation, whereas Japanese-English interpreters were found by the majority of the participants (79.31%) to have high ability.
Comments on the interpreters

1. Scripts should be provided with documents for each topic.
2. The interpreters should have sufficient knowledge about the topics of the seminar.
3. The interpreters should be more fluent, prompt/have tricks/know how to summarize, how to put words in order/should not translate word by word but arranged the words as they should be in Thai language/give better sequence in translation.
4. There were some problems with simultaneous interpretation system and the lecturers' noise was too loud.
5. Interpreters were not experienced in translation, spoke with low voice, and their translation was sometimes too slow with certain silence, unmotional expression, unclear and incomprehensible.
6. Technical terms were used incorrectly.
7. Japanese-English interpreters were better in translation.
4. On the management of the seminar and service

The finding is shown in Table 14.

Table 14

Degree of satisfaction with management and service

<table>
<thead>
<tr>
<th>Degree of satisfaction</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period of the seminar</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>66</td>
<td>43.42</td>
</tr>
<tr>
<td>Fair</td>
<td>71</td>
<td>46.71</td>
</tr>
<tr>
<td>Little</td>
<td>8</td>
<td>5.26</td>
</tr>
<tr>
<td>No information</td>
<td>7</td>
<td>4.61</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Venue</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>125</td>
<td>82.24</td>
</tr>
<tr>
<td>Fair</td>
<td>25</td>
<td>16.45</td>
</tr>
<tr>
<td>Little</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No information</td>
<td>2</td>
<td>1.32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Number of participants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>78</td>
<td>51.32</td>
</tr>
<tr>
<td>Fair</td>
<td>63</td>
<td>41.45</td>
</tr>
<tr>
<td>Little</td>
<td>8</td>
<td>5.26</td>
</tr>
<tr>
<td>No information</td>
<td>3</td>
<td>1.97</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>

P.T.O.
Table 14 (cont'd)

Degree of satisfaction with management and service provided

<table>
<thead>
<tr>
<th>Degree of satisfaction</th>
<th>No. of participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Atmosphere (including light/sound)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>92</td>
<td>60.53</td>
</tr>
<tr>
<td>Fair</td>
<td>56</td>
<td>36.84</td>
</tr>
<tr>
<td>Little</td>
<td>4</td>
<td>2.63</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Audio-visual aids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>56</td>
<td>36.84</td>
</tr>
<tr>
<td>Fair</td>
<td>72</td>
<td>47.37</td>
</tr>
<tr>
<td>Little</td>
<td>21</td>
<td>13.82</td>
</tr>
<tr>
<td>No information</td>
<td>3</td>
<td>1.97</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Reception and orientation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>96</td>
<td>63.16</td>
</tr>
<tr>
<td>Fair</td>
<td>50</td>
<td>32.89</td>
</tr>
<tr>
<td>Little</td>
<td>5</td>
<td>3.29</td>
</tr>
<tr>
<td>No information</td>
<td>1</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Hotel service</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Much</td>
<td>107</td>
<td>70.39</td>
</tr>
<tr>
<td>Fair</td>
<td>41</td>
<td>26.97</td>
</tr>
<tr>
<td>Little</td>
<td>2</td>
<td>1.32</td>
</tr>
<tr>
<td>No information</td>
<td>2</td>
<td>1.32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
</tr>
</tbody>
</table>
It was found that most participants were very satisfied with the venue, the number of participants, the atmosphere, the reception and orientation, and the hotel service. Most of them were fairly satisfied with period of seminar and audio visual aids.
Comments on the management

1. More seminars of this type should be arranged regularly.
2. The seminar should be widely promoted to encourage wider participation.
3. Educational institutes in engineering, science and technology, and companies dealing with inspection and testing service should be informed.
4. Training and workshop concerning T.Q.C. should be arranged.
5. Practical Q.C.C. seminar concerning statistics, sampling and administration should be arranged for specific group of participants.
6. To promote Q.C. activities in Thailand, Thai private sectors should be approached to give lectures together with the lecturers from Japan.
7. Lecturers from many countries should be invited to join in the lectures so that the suitable knowledge for each activity can be obtained.
8. The name of department concerned should be indicated in the invitation card to the company to avoid participation of those who were not directly in charge of such matter.
9. Executives should be encouraged to participate in this seminar because Q.C., Q.C.C. and T.Q.C. can really begin only with the recognition of its importance by the executive level.
10. A seminar of this type but of a smaller group (20 - 30 participants) should be organized if possible in Thailand, but the Thai organizers should have in mind the purpose of the seminar and the depth of the content. (This may be difficult because the needs of each sector are different.)
11. More participants from companies and organizations involved should be able to participate.
12. The content was very interesting. Unfortunately, because of the limit of participant number, a certain group of staff of the company had no chance to attend the seminar. Each organization should be able to send 2 participants. A number of 3-5 participants from each organization are preferred.
13. More time of lectures should be provided.
14. The seminar was fairly good. It provided the background knowledge for organizations to improve themselves.
15. The management of the seminar was excellent, especially with the management of time.
16. TISI or the Federation of Thai Industries should prepare video tapes on Q.C. so that factories or companies can borrow or reproduce for use.

17. A list of participants including their offices should be prepared and circulated to each participant for future co-operation.

18. Overhead projector did not give clear images.

19. There were too many participants.

20. It would be better if the venue of seminar is situated in the place where the traffic is not difficult.
Analysis of the findings

1. About the content

Most participants expressed their fair satisfaction when asked about the degree of satisfaction with the included topics. Nevertheless, most of them indicated that they were very interested in all specific topics. It is, therefore, possible that the actual degree of their satisfaction tends to be higher than it appears in the questionnaires.

2. About the lecturers

In relation to the lecturers' ability, it was found in some comments that they are more than excellent in qualification and in experience. However, the problem of communication and interpretation might have a negative effect on the participants' understanding, and consequently, the lecturers ability was judged as fair.

3. About the organization of the seminar

According to the filled questionnaires, many suggestions are received on the management of this seminar. Most of them are very useful and imply that those who gave them are interested in the seminar. More seminars of this type and with wider participation of the staff from their companies as well as from other institutes are desirable. Besides the seminar, other types of presentation; e.g., T.V. programme, video tapes are also suggested. This idea shows that standardization and quality control should continue to be promoted widely. Consequently, the seminar can be considered successful, at least, in the aspect of making the participants aware the importance of standardization and quality control by learning from the achievement of the industrialized country like Japan.
SEMINAR ON
INDUSTRIALIZATION THROUGH
STANDARDIZATION
AND
QUALITY CONTROL

Sponsored by
United Nations Industrial Development
Organization (UNIDO)
and
Ministry of International
Trade and Industry (MITI), Japan
Hosted by
Thai Industrial Standards Institute (TISI)
Organized by
Japanese Standards Association (JSA)
Co-operated by
Japan External Trade Organization
(JETRO), Bangkok

23rd – 25th January 1990
The Landmark Hotel and Plaza, Bangkok
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SEMINAR ON
INDUSTRIALIZATION THROUGH
STANDARDIZATION
AND
QUALITY CONTROL

Keynote Speech for the Seminar on Industrialization through Standardization and Quality Control for ASEAN Countries

- Outline of Industrial Standardization & Quality Control -

Speaker: Mr. Hiroshi SHIMA
Director General of Standards
Department, AIST, MITI
Time: 10:50 – 12:00

Significance of Standardization and Quality Control in the Developing Stage of the National Economy

- Enhancement of Efficiency and Activation for Business Management -

Speaker: Mr. Hidetaro MORI
President of Daiwa Seiko, Inc.
Time: 13:30 – 16:30

23rd - 25th January 1990
The Landmark Hotel and Plaza, Bangkok
1st day
Jan. 23 - 25, 1990

Keynote Speech for the Seminar on Industrialization through Standardization and Quality Control for ASEAN Countries

- Outline of Industrial Standardization & Quality Control -

by Hiroshi SHIMA
Director General of Standards Department, AIST, MITI

1. Objective of the Seminar

Quality control and standardization are key instruments for developing industry.

The figures 1 - 5 show the relation between export quantity and the ratio of rejected products according to the export inspection law in Japan. These show clearly the amount of exports depends on the quality of products.

The objective of the seminar is that the techniques of quality control and standardization which have been obtained in the experiences in Japan will be transferred to ASEAN countries. UNIDO and Japan which sponsor it expect that the seminar stimulates the development of ASEAN industries.

In this sense, as I will explain in '3. History of Quality Control', the start of the quality control movement of Japan was marked by a legendary seminar held by Dr. Deming.

The seminar ignited passion to study the quality control methods in Japan. Since Japan got benefits from Dr. Deming's seminar enormously, I think that Japan should assist other countries to develop and promote quality control and standardization now. I sincerely hope that this UNIDO seminar will contribute to promoting quality control movement and standardization which is the shortest pass toward prosperity of Thailand and other ASEAN countries.

2. Objective of Quality Control and Standardization

(1) Relation between Quality Control and Standardization

Quality control and standardization cannot and should not be separated in their application to production. Quality control is essential to conform to standards and to satisfy user's demand. Both national standards and company standards provide the criteria for implementation of quality control.

As a method to connect both quality control and standards, many countries adopt certification systems for promoting quality control and standardization. In the JIS marking system of Japan, the conformity to the standard as well as the level of quality control in the company are examined so that the JIS marking system has significantly contributed to the development of Japanese industry. To apply for obtaining JIS...
mark, a company should introduce quality control method according to the criteria for examination of JIS marking system. This criteria is designed to be beneficial to incorporate quality control systems into companies' production systems. After Japanese industries suffered from bad reputation of poor quality products, companies introduced quality control system by challenging to apply for JIS marking approvals. Follow-up surveillance played an important role for checking quality control systems.

(See the detail of the JIS marking system in Annex.)

Like JIS marking system, TIS marking system plays an important role for promoting quality control and standardization in Thailand.

(2) Implication and Effect of Quality Control

Quality control can be defined as a method to develop and produce products economically which can satisfy user's demand. Unless a company fully understand the meaning of quality control and implement it, the company will lose its competitiveness.

All of the activities in a company can be related to quality control. From Japanese experiences concerning activities of quality control, we can say the purpose of quality control in Japan is summarized as follows:

- to realize demand of customers on functions, reliability, safety, economy or service;
- to implement objectives rationally and economically by using scientific methods such as statistical methods;
- to solve problems of quality assurance, quantity control, costs or safety effectively through participation of all organizations including market research, planning, development, production and sales.

The feature of Japanese quality control activities are summarized as follows.

a) Total quality control

Under the leadership of the top executive, all employees participate to implement quality control over the all activities in the company.

b) QC circle

To solve problems workers face every day, they form a quality control circle which they can voluntarily participate. Many countries are interested in this activities as the secret of Japanese success.

c) Surveillance on quality control system

Top executives themselves visit all departments to carry out surveillance on quality control system in the company. As surveillance conducted by others, inspections for JIS marking system and Deming prize provide good opportunities to check company's quality control system.
d) Utilization of statistical methods

Statistical methods are basic methods for quality control. Japanese feature is that even less skilled workers can utilize simple statistical methods.

e) Education and training for quality control

Education and training for quality control are organized as the best tools to make employees understand quality control methods. For example, JSA hold training course for 50,000 people every year.

f) National wide activities for promotion of quality control

We have various activities such as lectures, seminars and magazines to promote quality control. These activities contribute to promote quality control toward wide variety of industries.

Nowadays, Japanese quality control is not only isolated activity within one company but more comprehensive activity cooperated by group companies. The objective of quality control has been expanded to include activities such as improving productivity, saving energy and reducing costs.

(3) Objective of Standardization

The objective of standardization is:

a) economic benefits from rationalization and simplification (Scale merits)

b) interchangeability

c) communication

d) assurance of consumers' benefits

e) protection for safety and health

Concerning a), Professor Matsuura has shown by his statistical analysis that if the number of kinds of products is reduced by 1/2 through standardization, the unit costs can be reduced by around 15%. Not only national standardization but also company standardization can contribute to increasing company's profits.

Concerning b), c), d), and e), rather national and international level standardization is responsible for implementation.

Nowadays, the importance of b) increases because information technology plays a significant role in the world economy. Segmentation of market of information technology impose costs on national economy very much because of high development costs of information technology. A variety of industries using information technology understand the strategic importance of interchangeability and form groups to develop standards for interchangeability. OSI (Open System Interconnection) which makes it possible to exchange data among different computer systems is the most successful example of these movement. Outside of computer industry, many users try to establish computer network systems for sales activities and production control in which interchangeability is essential.
Besides interchangeability, I would like to remind that, in many cases, the quality level of national standards are developed to specify minimal requirement for d) and/or e). This means that users demand to quality level may be higher than specifications of national standards. Thus, companies should develop their own company standards which provide appropriate level of quality specifications according to users' demand in more concrete manner to operate their production smoothly. We find some companies consider that the quality level of national standards are enough in spite of severer requirements of users. The success of Japanese companies is attributable to the fact that they well understand that national standards are necessary condition, not sufficient condition and respond to users’ demand positively.

3. History of Quality Control and Standardization in Japan

The first application of quality control methods to industry was control charts devised by Dr. Shewhart in U.S.A. in 1930s. The second world war prompted American armament industries to use quality control. At that time, the introduction of statistical quality control succeeded in improving quality of production in U.S.A.

Until the end of the world war II, only academic research was conducted in the field of quality control in Japan. After the world war II, American occupation army in Japan found many troubles in telephone system due to bad quality of communication equipments. To secure smooth operation of the telecommunication system, American occupation army recommended Japanese communication equipment industry to adopt statistical quality control and gave guidances.

Japanese Standards Association (JSA) was founded in 1945 and Japanese Union of Scientists and Engineers (JUSE) was founded in 1946. Both organizations have played significant role for promoting and educating quality control in Japan. During the first stage of promoting quality control, the experiences showed that simple translation from American books of quality control to Japanese did not work well because of human factors of quality control.

In 1949, Japanese Industrial Standardization Law was enacted. According to this law, the JIS marking system started. Under the JIS marking system, quality control as well as conformity to JIS standards have been examined. To apply for approval of JIS marking, many companies have studied quality control methods in Japan. Especially from 1949 through 1960s, the JIS marking system magnified the speed of introduction of quality control in Japan, as many executives admitted. During those period, 'made in Japan' still meant cheap but bad quality in the world market. The improvement of quality contributed to Japanese rapid growth tremendously.

In 1950, Dr. Deming of U.S.A. came to Japan to hold a seminar to make presentation on statistical quality control. He enjoyed great success in the seminar. Using the benefits from the publication about Dr. Deming’s seminar, we now have Deming prize which is only given to the most excellent company concerning total quality control. The seminar made Japanese industries understand the importance of quality control.

However, during first half of 1950s, too much emphasis was imposed on statistical quality control and top executives rarely understood the importance of executive's role in quality control. In 1954, Dr. Juran of U.S.A. came to Japan to hold a seminar to persuade executives to involve themselves more actively in quality control. The seminar provided an opportunity to change directions from statistical quality control to total quality control in Japan.
Education for quality control was started on radio in 1956 and on TV in 1957.

Surprisingly, more than 100,000 textbooks for TV were sold at that time. In 1962, the group led by Dr. Ishikawa advocated to start QC circle movement. These QC circle activities as well as education and training seminars held by JSA, JUSE or manufacturing companies themselves made quality control concept penetrate into all level of staffs in companies.

With these organizational efforts to promote quality control, Japanese industries recognized that tests to prevent fault outputs were not sufficient. Concerning this point, still many companies in other countries believe that quality control means tests. But this is not true. There are two main reasons. Firstly, all essential items cannot be tested. For example, strength cannot be tested for all products, if destructive tests are required. Durability or reliability cannot be tested for all products, while Japanese products have won good reputation in the world market about durability and reliability. Secondly, if only tests are used to assure quality, the costs are higher than those of TQC.

Thus, quality control in production phase was emphasized in Japan at the beginning. Furthermore, consumers' demand shifted towards higher-grade while Japanese economy developed. To meet diversified high-grade demand, it was essential that quality control should include planning and designing phase. Marketing activities such as researching users reaction and responding users' claims were emphasized as well. In this way, the style of TQC in Japan was established in 1960s.

In 1970s, the method was refined to correspond to oil shocks. Until now, TQC has been used to realize reliability, development of new products and rationalization process.

The above history is a good example for ASEAN countries to develop and promote quality control methods. I would like to stress that it took a long time to accomplish our own style of TQC since we first learned quality control from U.S.A., and that voluntary efforts of industries played a significant role.

4. Conclusions

Quality control and standardization are best tool to improve competitiveness in the world market. The Government of Japan has decided to assist the Industrial Standardization, Testing and Training Center of TISI in order to transfer Japanese experiences in the field of quality control and standardization to Thailand. I hope that Japanese experience will contribute Thailand and other ASEAN countries development through quality control and standardization.
Fig. 1. Export quantity and rejected ratio (Tape recorder)
Fig. 2. Export quantity and rejected ratio (Tape player)
Fig. 3. Export quantity and rejected ratio (Pliers)
Fig. 4. Export quantity and rejected ratio (Oil pressure gauges)
Fig. 5. Export quantity and rejected ratio (Spakers)
Figure 6. History of Japanese Industrial Standards

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Secretariat:
- 1922-1925: Engineering Bureau of Agriculture and Commerce Ministry
- 1925-1930: Engineering Bureau of Commerce and Industry Ministry
- 1933-1939: Control Bureau of Commerce and Industry Ministry
- 1945-1948: Patent and Standards Bureau
- 1930-1937: Temporary Industry Rationalization Bureau of Commerce and Industry Ministry
- 1942-1945: Agency of Technology
- 1952-Present: Agency of Industrial Science and Technology

Period during which standards were being established
Annex. Industrial Standardization and JIS Marking System

1.1 Outline of Industrial Standardization

In Japan, ever since the Meiji-era, the necessity for industrial standardization has keenly been realized as means to modernize the industry and enhance the national wealth leading to the trend to promote the unified standardization activities. Inter alia, in the light of the experience that the industrial standardization in European countries had played a large part in World War I, the Japan Government had established the Industrial Standards Unification Committee in 1921. The Committee had been developing more than 2,000 standards related to the mining and engineering during 25 years lasting until the end of World War II. As a result, the industrial standardization in Japan had expanded to the great extent. In August 1945 immediately after the end of World War II, the circumstance surrounding the industrial standardization, too, had changed greatly converting the establishment of standards based on the demand of munitions into the plans of new era and the newly established Industrial Standards Committee took over the work of standardization. In June 1949, the Industrial Standardization Law was enacted with the aim of keeping the national unification and progress of this activity in accordance with the integrated concept of standardization.

Japanese Industrial Standards Committee which was established in the Agency of Industrial Science and Technology, the Ministry of International Trade and Industry on the basis of this law took charge of the all-out review of the then existing standards and studying the development of new standards. The committee which consists of manufacturer, consumer seller, scholar and man of experience and official of governmental organization concerned and so on are appropriately organized to make decision democratically in the discussion to develop the standards. Final decision to adopt the standards is made by the competent ministers who have the jurisdiction over the production of relevant mining and engineering products, i.e. the International Trade and Industry Minister, Health and Welfare Minister, Agriculture, Forestry and Fisheries Minister, Transport Minister, Construction Minister, etc. (See Industrial Standardization Law Enforcement Regulation Article 1). When the ministers are to develop the standards they have to submit the drafts to Japanese Industrial Standards Committee for studying prior to make the decision. The standards decided by the competent ministers after the careful deliberation in the Committee are Japanese Industrial Standards the acronym of which are used popularly as JJS.

The present organizations in charge of the promotion of industrial standardization in Japan are shown in Figure 1. Total number of existing JIS comes up to 8110 as of the end of 1986 as shown in Figure 2. JIS developed once is not in force as it is forever, it is revised where necessary and is subjected to the deliberation at Japanese Industrial Standards Committee once at least every five years for review to decide whether it is reaffirmed it is or revised or abolished in order to make assure that JIS keep its contents to meet constantly the progress of technology and the change of economic conditions.

1-1-12
Figure 1. Organization of National Industrial Standardization Activities in Japan

Notes
1. Approved factory, communicated inspection and approved inspection agency apply to the overseas matters.
2. Remarks indicate the relevant ministers carrying out the JIS Marking System.
3. ** Foreign manufacturers or processors can attach the inspection data from the foreign inspection agency approved by the relevant minister in application. When the appropriate documents for inspection data are attached, the examination by the relevant minister in foreign factory is not carried out.
Still more, as it is strongly requested from every quarters that JISs incorporate the stipulations for practical performance, durability and safety of the products and the like, the attention is paid to the fulfillment of JIS contents as to JIS for the products. In these days, the attention is attracted to the role and effect of standardization played in leading the establishment of developing base for the new-technology, information related technology and the like developed rapidly in recent years so that the following activities are carried out actively: the promotion of standardization of soft ware, hard ware, communication, etc. needed to develop without confusion the information process by computer; standardization of various kinds of part, component and unit for residential use in order to accelerate the mass production in factory; standardization of equipments for distribution of goods; standardization for consumers good or prevention of pollution; standardization for saving resources and energy and so on.

When JIS have been newly made, revised, reaffirmed or abolished, all of them are announced in official gazette. In case of new standards and revised ones, it is natural to show the full text of standards on the gazette, however, the limited space of gazette pages is now making unable to do so and only the number and title of standards and the date of enactment, revision, reaffirmation and abolishment are indicated. All JIS are prepared and ready to be seen by the public at the Agency of Industrial Science and Technology, relevant ministries and their regional bureaus (see Reference 3 as for the locations) and the gubernatorial offices all over the country, and JIS are all printed and published by Japanese Standards Association.

1.2 JIS Marking System

When buying the commodities we use in factory or home, we usually do based on the trust in the name of manufacturer or the brand of products feeling sometimes anxiety about the unknown quality of products which is of vital importance and unable to understand only by looking at the appearance, for instance, that up to what kilogram of tension strength the wire endures or how long time the dry battery can light a lamp. In order to resolve the problem like this, it should be the suitable way to put the mark on each product and indicate its important quality which is unable to catch only by the survey of appearance.

But it is not so easy to express commonly the conditions indicating the quality, and if it is done so, the confidence may not be won so easily except the popularly known companies. Furthermore, if company by company guaranty is made arbitrarily for different quality, confusion must arise giving trouble to consumers. Therefore, JIS may be of vital importance from the view point of users and consumers, if the products are manufactured conforming with the specification of JIS and the conformity is understood correctly and easily.
JIS Marking System stemmed from the consideration for the benefit of users and consumers so that it certifies the quality of the products by means of expressing the JIS Mark on the product itself produced in conformity with JIS or on its package, container or invoice. Ever since the enactment of the Industrial Standardization Law the system has been rapidly popularized during last some 30 years and the permitted factories have come up to 16,000 in total and, consequently, the expectation given to JIS Mark by manufacturer, user and consumer are increasing more and more.

The marking systems like this are adopted, as quality certification mark system, in many countries promoting the industrial standardization activities.

In Japan, from 1949, a time when the Industrial Standardization Law was established, the items on which JIS marking is considered to give a great effect are designated as the relevant commodities to JIS Marking System, and the manufacturers who produce the commodities like these (hereinafter referred to as "designated commodities") are permitted to put the JIS Mark shown in the following Figure on the products (see the Law article 19). And then the law was partially revised in July, 1966 to give the permission to put the JIS Mark shown in the Figure for the items of the designated processing technique (hereinafter referred to as "designated processing technique") in accordance with the specialization of mining and engineering products' processors and the importance of processing technique (see the Law, article 25). Selection of the items of this processing technique is made based on the following points: The processing technique gives a great effect on the quality of products; many specialized processors are exist; there is, in particular, necessity to make secure and level up the processing technique of processors; the selection of the processors is considered difficult on the side of manufacturers who are the purchasers of processing and so on.

The items specified like this as objective of JIS Marking System are called the designated item and the designated processing technique and the commodities produced and processed in the factory are called the designated commodities and the designated processed commodities respectively.

Two kinds of marking system are there and, at present, JIS Marking System for the commodities are administrated by the Ministers of International Trade and Industry, Transport and Health and Welfare (hereinafter referred to as "relevant minister" conclusively) and JIS Marking System for the processing technique is done by the Minister of International Trade and Industry.

"Agreement on Technical Barriers to Trade (GATT Standard Code)" which came into force on 25 May 1980 stipulates that 1) conformity of the standard to international standard shall be considered when establishing and 2) certification system applied internally shall be opened for the imported goods, for the purpose of not making the standards and certification system the unnecessary barriers to international trade. Consequently, the Industrial Standardization Law was revised largely on 25 April 1980 including the following substances of the provisions:
1) The manufacturers and processors who produce or process the JIS Mark designated commodities or designated-processed commodities in foreign countries can put the JIS Mark on these commodities provided they are approved by the relevant Minister for their each factory in the very same way in Japan (see the Law Article 25-2, 1).

2) When the relevant Minister deems that the factory inspection is particularly necessary to make sure the conformity to JIS of the commodities to which JIS Marking is applicable in the light of the contents of JIS when revised and the situation of the permitted (approved) manufacturers in securing the quality, he can notice officially on the official gazette and oblige the permitted (approved) factories of the designated commodities or the designated processed commodities to be subjected, within the specified period, to the inspection carried out by the inspection agencies to which the relevant Minister gave the permission or approval (permitted inspection agency or approved inspection agency) (see the Law, Article 21-2).

The outline of JIS Marking System for commodities as well as processing technique is as follows:

(1) When it seems that the marking to indicate the conformity of certain commodities to JIS is necessary to the users and consumers, the relevant Minister designates the commodities based on the stipulation in the Industrial Standardization Law (Article 19) after the full investigation into actual conditions of production, distribution, use and consumption of products and asking the opinion at the Japanese Industrial Standards Committee and then notify on the official gazette the JIS related to the commodities, marking method, etc. (see JIS Yearbook as for relevant minister, designated commodities, designated processing technique and JIS concerned).

(2) The manufacturer and processor who produce the commodities conforming to JIS concerning the designated commodities in their own factories can make application for the permission (approval) of JIS marking to the relevant Minister.

(3) When made the application for marking permission (approval), the relevant Minister directly sends on the officials concerned to the applicant factory to examine the technical manufacturing conditions necessary to secure the quality such as the manufacturing facilities, inspection devices, inspection methods, condition of quality control, etc. related to the application, and then gives the permission (approval) to put the JIS Mark provided that he deems that the factory has the technical manufacturing conditions capable of producing continuously the goods conforming to JIS for a long time in the future not only producing at present the goods conforming to JIS. Then the permission is notified on the official gazette. Nevertheless, when the technical manufacturing conditions are not appropriate or the quality is unstable, the permission (approval) of JIS Marking is not given.

(4) After the permission (approval) of JIS Marking, the relevant Minister does not carry on the inspection on each product, the manufacturers permitted (approved) do the JIS Marking under their own responsibility.

(5) The relevant minister, after the permission (approval) where necessary, asks the permitted (approved) manufacturers to report on the conditions of quality control such as whether or not the products conforming to JIS are manufactured under the proper technical conditions or marking is made appropriately, and, sometimes, conducts on-the-spot inspection of the factory sending on the officials concerned or the inspection by the accredited (approved) inspection institutes. As a result of this,
the action is possible to revoke the permission (approval) or discontinue the sales of JIS Mark commodities when the quality or the technical manufacturing conditions of products are called in question.

In this sense, the marking system is purported that the users and consumers can buy without anxiety the goods conforming with JIS or those produced in accordance with JIS-specified processing technique so that it contributes to the simplification and justification of trade to a great extent and, at the same time, it plays a large part in disseminating the idea of standardization and JIS. Furthermore, as the introduction of quality control is the prerequisite for giving the permission (approval), the system is working as a booster in introducing the statistic quality control into enterprise and, in particular, the effect on medium-small size enterprises are extremely strong in this aspect.

Commodities and processing technique to which JIS Marking System applies are designated by the relevant Minister from among the commodities and processing technique of mining and engineering products which are specified by JIS. The criteria of selection of the commodities or processing technique are, in general, the following items as described below even though the emphasis is placed on different point according to the economic and social demand at each time.

1) For accomplishment of specific policy target
   a. safety
   b. preservation of environment • sanitation
   c. saving resources • saving energy

2) For common consumers and medium-small size enterprises
   a. common producers' products
   b. medium-small enterprises' products

3) Others, for rationalization • justification of trade
   a. measuring instruments, testing and analyzing devices, reference materials, etc.
   b. products demanded by governments
   c. others (distribution quantity of goods, number of manufacturers, technical level, etc. are considered)

Designation or revocation of commodities or processing technique are reviewed concretely every year on the basis of the above criteria.

Number of commodities and processing technique designated based on JIS Marking System has come up so far to more than 1,000 but those which decreased the effectiveness to keep as objective of JIS Marking System have been removed even though they were once designated in the past. As of the end of fiscal year 1986, the number of designated commodities and processing technique are 1037 and 10 respectively and total number of permission has come to 15686.
1.3 Effect resulted from becoming JIS Marking Factory

Needless to say, the factory permitted JIS Marking (hereinafter referred to as JIS Marking factory) has the customer's confidence derived from the fact that quality assurance is materialized well, it may, moreover, play an active part in the field where being JIS Marking factory is the condition of trade. Among other things the biggest effect is that they grapple with the constitutional betterment of the enterprise to level up the power of factory as a whole by means of introduction of the total quality control hoisting the banner reading "Be JIS Marking Factory".

That is to say that the building up the system capable of manufacturing continuously the uniform products (including processing) conforming to JIS through the promotion of company standardization and quality control is required as shown later on in the subclause 2.4 – Examination and Permission.

In the wake of the company system arranged like this, various effects occur in the factory, for example:

(1) **Information is communicated promptly and correctly**
   - (a) The information about the quality of products, process capability, etc. is exchanged in each section in the company and, in particular, the exact information on the product quality can be obtained in business section, too. This makes possible the quick reaction to the demand in such ways that they introduce the characteristics of products to the customers or communicate the demands, complaints, etc. from the customer gathering together to each section in the company.
   - (b) Thanks to the good arrangement of structures in company, systematic activities in each section are made actively, organic relationship is kept between sections and, as a result, the contents of policies and plans of enterprise are known thoroughly being facilitated their implementation.
   - (c) Responsibility and competence within and inter sections is clarified by standardization. This leads to the promotion of business ensuring the control activities of PDCA (Plan, Do, Check, Action) in the place of work.

(2) **Accumulation of technique and advancement of technical power are expected**
   - (a) Engineering technology like manufacturing technique can be accumulated as enterprise's technique by standardization.
   - (b) It is possible to shorten time and save cost needed for design, at the time of designing new products or changing design, by using practically the manufacturing technique accumulated so far, standard materials, standard parts, etc.
   - (c) Partial improvement in manufacturing process and quality of materials by reviewing them based on the information on complaints can help improve the quality of products.

(3) **Control criteria are clarified and control action is facilitated**
   - (a) Control criteria for manufacturing process are clarified so that finding of problems is facilitated resulting in the advancement of manufacturing process and the decrease of fraction defective.
(b) Control criteria for machine and equipment control are clarified so that the machine and equipment are constantly arranged resulting in the improvement of ratio of operation of machine and equipment.

(c) Control criteria for warehouse control are clarified so that keeping of proper inventory quantity is facilitated resulting in the decrease of the cost for inventory keeping and the prevention of quality of products and materials from degradation.

(4) Practical use of statistical methods are made possible
(a) Finding the abnormality of manufacturing process by means of using control charts and analyzing the cause by means of using statistical methods like the cause and effect diagram are made to be done.
(b) As it is possible to grasp the mean value or dispersion of quality of products and process capability by using histogram, the process improvement is made more easily.

(5) Types of products, parts, materials and the like can be decreased
(a) Production activities are carried out using mainly the standard goods, standard parts and standard materials so that mass production of goods and decrease of types of parts and materials lead to cost down of products.

(6) Stability and improvement of quality
(a) Education of standardization and quality control is given to workers in order to put the control of materials, manufacturing process, equipment, etc. forward and, as a result, dispersion of product quality decreases and finally the quality is improved and stabilized.
(b) Manufacturing process is improved by utilizing the records of process and inspection and control criterion is levelled up so that the quality level of products is heighten and consequently the customer's confidence is obtained.

(7) Cost down
(a) Expenditure for materials, warehouse control and the like is reduced inasmuch as the types of materials, parts, products, etc. are minimized through simplification and standardization.
(b) Reduction of product types given rise to lowering of production cost because the possible enlargement of production lot makes the time of arrangement change shorten and the rate of machine operation advance.
(c) Expense for business and management in company is reduced in such ways as decreasing types of materials, parts, products, etc. and standardizing business order, procedures, methods.

(8) Others
(a) Factory is put in good order, working field is cleaned up and working environment becomes fine.
(b) Effective enterprise activities are possible without waste all over the company.

1-1-19
Significance of Standardization and Quality Control in the Developing Stage of the National Economy – Enhancement of Efficiency and Activation for Business Management –

by Hidetaro MORI
President of Daiwa Seiko, Inc.

1. Preface

Business environment Domestically and overseas markets, and balance of supply and demand

Standardization and quality control Standardization in companies, regional societies and nations, and also in international level SQC and TQC

2. Basic conditions for business management Efficient management

(1) Transfer of accurate information Standardization and measurement
(2) Shortening of the life of merchandises
(3) Diversified needs by customers
(4) Conditions as international conglomerates

3. Business management and standardization inside the companies

(1) Establishment of clear target Problem consciousness concerning duties
(2) Establishment of specific evaluation system QCD
(3) Promotion of standardization appropriate to one’s own business

"Bringing up of specialists, Transfer of authority"

4. Activation of business and quality control

(1) Grasping of present situation of one’s own business
(2) Scientific management Utilization of statistical methods (Efficient use of engineers)

Average and dispersion Stratification
Sampling inspection, Control chart and Experimental design
(3) QC circle Participation mind of all members
5. Quality control for research and development

Engineering technology and management technology

6. From on-the-spot quality control to total quality control

"Quality be produce in Process"
"Next process is our customer"
"What determines the quality (Q) of merchandise is the quality (Q) of the production system (4MS)."
"Industry develops only when a brain (research and development) and hands and legs (production) are combined in one body. It does not develop when a brain (research and development) and hands and legs (production) work separately."
"It is industry that delivers to the market merchandise with good overall cost performance including sales and services."

The topic of my today's lecture is "Positioning of Quality Control and Standardization in the Process of National Economic Development," but as I am an engineer brought up in private manufacturing companies - Toshiba Corporation, Tokyo Electric Co., Ltd. and Daiwa Seiko Co., Ltd., I am afraid that I am not in a position to discuss "national economy," and the best I can say is "... in the process of development of an industrial nation."

The development of national economy, however, is based on the most efficient activities of various industries and businesses at their respective positions. In other words, I firmly believe that when each business is managed most efficiently and actively and achieves prosperity it is gathered together, leading to the development of a nation as a collective result. In this sense I wish to put a subtitle "Enhancement of Efficiency and Activation of Business Management" besides the main title.

To manage an enterprise efficiently and actively "the management concept" of the enterprise should be clarified. An enterprise should contribute to its shareholders, employees, related companies and the society through its business activities. (Our company has the management concept and management policies as mentioned in the attached sheets.)

Now I wish to proceed to the main topic of today - enhancement of efficiency and activation of enterprise management. The first step we should take is to recognize the present state. As a matter of the fact our society is based on mutual dependence. To recognize the present state of the position of our company or that of the project to make from now is important. For example,

What is the size of the market?
Can the technology of our company be used?
Can we make products different from those made by other companies?

These questions we should consider.

Furthermore, the most basic matter for daily activities, when managing a business is transfer of accurate information.

As a business is not operated by a person, but several persons or thousands or more of
persons working together, in order to operate it efficiently transfer of accurate information—
from superiors to subordinates, among co-workers and from subordinates to superiors is a
basic matter.

Standardization and a figure system play a very important roll in transferring accurate
information. I think it is needless to mention the importance of standardization, but if I take
simple examples, it means works and letters. The fact that various languages are used in a
country or in the world constitutes a cause for various international frictions at present. Loss
due to this is also enormous. If two or three kinds of words and letters are needed in a
company, it will cause serious complication and lack of understanding.

We have a standard language and local tongues called dialects in Japan, and it was once
difficult to understand dialects at the center of the country, but due to diffusion of radio and
TV such inconvenience has been removed at present, as people understand the standard
language throughout the country. The importance of standardization can be easily seen from
this example.

When the definition of words has been clarified like this, our intention is transferred to
other people as a concept, but their accuracy is still insufficient. What makes up this shortage
is a figure system which expresses things in figures.

"It is very cold this morning" is good enough for daily greetings, but it does not convey
the fact accurately. When we say in Japan "It is warm this morning" and when we say in
Thailand "It is very cold this morning," the meaning differs greatly. Why? Because, when we
say in Japan "It is very warm this morning," it may be 0°C, and when we say in Thailand "It is
cold this morning," it may be +10°C. If we say it is 0°C in Japan and it is +10°C in Thailand
— to express things in figures is called a figure system — we can understand clearly the mutual
situation by such an expression. We have many examples like this around us. A vague and
hard to grasp expression causes no friction in our daily greetings and idle talks, but efficient
management cannot be made.

It is important to start training enabling transfer of accurate intention — standardization
and a figure system.

Only by doing this, scientific enterprise management becomes possible, and good effects
of quality control are obtainable.

The above is the gist of my lecture, and I wish to make my detailed explanation following
the table of contents.

Attached sheet 1 Management Concept of Daiwa
Attached sheet 2 Check List Concerning the Development of New Products and
New Markets
1. Management Concept of Daiwa

Business Philosophy

"Creation of an attractive company, and contribution to the development of society"

Management Policies

• Consumer-oriented management
• Achievement of completely efficient management
• Establishment of Multi-National Sales and Production System
• Management with the involvement of all personnel

Work Regulations

• Timing and schedules must be accurately maintained.
• Quantities must be kept accurate.
• Work areas must always be tidy, neatly arranged, and kept clean and beautiful.
• All personnel must develop good mutual intercommunication, and a bright, comfortable workplace must be created.

Rules for Administration

• Information must be transmitted without delay.
• Decisions must be made quickly.
• Action must be prompt and measures taken must be sensible.
2. Check List Concerning the Development of New Products and New Markets

For the most efficient management of a business, the growth and development of an enterprise by the development of new products and new markets are basic and important matters.

1. 3 steps for the development of new products and new markets

   The development of new products and new markets can be classified into the following 3 steps:

   (1) Decision of the development policies of new products and new markets by the top (P and VP class),

   (2) Development of new products using new technology, centering on the engineering (research) division, and

   (3) Development of new and improved products to maintain the existing product fields and markets, centering on the sales (operation) division.

2. Check points to make a project — when a specific new product has been decided.

   (1) Is the scale of a project appropriate? — Inappropriate, as it is too large or inappropriate, as it is too small

   (2) What is the capacity of competitors who may come in?

   (3) Is the sales network available? (Can it be made?)

   (4) Are design engineers available? (Can they be brought up?)

   (5) Is manufacturing technology available? (On the similar or the same line?)

   (6) Can important parts be made within the group? (Is the group strong?) If important parts are not available on our side, we will lose fight.

   (7) Do we have a sufficient development (sales) time? (Q.C.D.)

   (8) Can the technology of other companies be used?

   (9) Is it possible to take a 20% share?

3. When a top (central) decision is made, set up items which can be considered to give an impact to the industry in about 5 years from now.

   ex, communications, space, biotechnology, etc.

4. Specific procedures

   Middle term planning --- Rolling --- Making products --- Technical Research Committee

   Decision of intelligible slogans

   * Any way let's start it (If one out of ten hits ...)
     * Do not give up by one trial.
     * Do not miss a time to stop.
### Project Check List

- Centering on TOP
- Centering on Engineering (Research) Division
- Centering on Sales (Operation) Division

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<thead>
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<tbody>
<tr>
<td>1</td>
<td>Appropriateness of scale of project</td>
</tr>
<tr>
<td>2</td>
<td>Capacity of competitors</td>
</tr>
<tr>
<td>3</td>
<td>Sales network</td>
</tr>
<tr>
<td>4</td>
<td>Design technology</td>
</tr>
<tr>
<td>5</td>
<td>Manufacturing technology</td>
</tr>
<tr>
<td>6</td>
<td>Supply of important parts</td>
</tr>
<tr>
<td>7</td>
<td>Development (sales) time</td>
</tr>
<tr>
<td>8</td>
<td>Use of technology of other companies (Patent strategy)</td>
</tr>
<tr>
<td>9</td>
<td>20% share</td>
</tr>
<tr>
<td>10</td>
<td>Others (Positioning within group)</td>
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SEMINAR ON
INDUSTRIALIZATION THROUGH STANDARDIZATION AND QUALITY CONTROL

Standardization and Quality Control on Factory Management (I)
- Quality Control at Toyota Motor Corporation -

Speaker: Mr. Zenzaburo KATAYAMA
General Manager of TQC Promotion Department of Toyota Motor Corporation

Time: 09:00 – 12:00

Standardization and Quality Control on Factory Management (II)
- An Experience of Promotion on Company Standardization and Quality Control in The Furukawa Electric Co., Ltd. -

Speaker: Mr. Masaru SEKIGUCHI
Director of Eiko Development Co., Ltd.
Past General Manager of Quality Control Division of The Furukawa Electric Co., Ltd.

Time: 13:30 – 16:30

23rd – 25th January 1990
The Landmark Hotel and Plaza, Bangkok
1. Introduction and Promotion of Quality Control

(1) Introduction of TQC

Toyota Motor Co., Ltd. decided to introduce TQC in 1961. A big economic problem in Japan at that time was liberalization of foreign trade, and each enterprise was making efforts to increase international competitiveness of its products to cope with the situation.

It was also urgently required of the auto industry to realize quality and cost on the international level, and Toyota Motor Co., Ltd. introduced TQC for a measure to achieve the above objective, expecting that it would develop to a company with a constitution enabling modern industrial production.

Quality control was studied in 1949 centering on the Inspection Department at that time. Statistical methods such as control charts and sampling inspection were applied, and good effect was achieved in the improvement of quality by active use of experimental plans. We further planned to implement the concept of quality control throughout the company to realize the improvement of quality and the reduction of cost.

Toyota Motor Corporation of today has grown to No. 1 auto-maker in Japan and the 2nd in the world on the basis of these activities, and TQC is being promoted not only in all Toyota but to related companies, suppliers and dealers.

(2) Building up of Quality in Processes

Speaking of the concept of quality control in short, it is to place the processes under the state of control by means of quality and produce economically uniform products. In this sense to make good products good processes should be made. The words "Building up of Quality in Processes" indicate the original state of quality control as against the concept of putting importance to inspection by which good products and bad products are selected and separated.

When we say processes, they usually mean manufacturing processes, but at Toyota Motor Corporation they were made to indicate the processes covering planning for products to their sales. In other words, we have considered the whole processes from planning for products to their use on the market such as planning, designing, preparation for manufacture, purchases, production, inspection and
sales, and what items should be assured on each stage for the processes to follow, what operation should be done to achieve these items, and who are the responsible persons have been clarified, and the system of quality assurance with the concept "The next processes to follow are customers" has been set up on each stage.

If abnormality is found in products, analysis is made to see in what process the problem has happened, and by improving properly the operation which has caused the defect this system is refined.

By replacing feedback which can be considered in the narrow sense of the control of the processes and the manufacturing processes with the one in the broad sense our products have improved quickly in quality and cost.

We are conducting "Building up in Processes" even today.
Table 1.  Table of Quality Assurance Activities in Quality Assurance Regulations

<table>
<thead>
<tr>
<th>Step</th>
<th>Assurance Item</th>
<th>Operation for Assurance</th>
<th>Responsible Person for Assurance</th>
<th>Division of Assurance</th>
<th>Major Related Regulations</th>
<th>Remark</th>
</tr>
</thead>
</table>
| (1)  | Comprehensive planning | Comprehensive effectiveness of new product planning | 1. Demand forecast and prospect for share securing  
2. Forecast of strategy of competing enterprises  
3. Draft and evaluation of long term management planning | Business Department General Manager  
Overseas Business Department General Manager  
Comprehensive Planning Room General Manager | Regulations of Drafting Long Term Planning (Aa 301) | |
| (1)  | Comprehensive long term planning for new products | Comprehensive effectiveness of planning classified by product lines | 1. Demand forecast · examination of applicability of product lines for request for new products  
2. Engineering forecast and examination of adjustment of new development items  
3. Explanation of comprehensive balance of new product development capacity | Business Department Director  
Overseas Business Department Director  
Engineering Planning Room General Manager  
Product Planning Room Chief Engineer | | |
| (1)  | Individual planning for new products | Appropriateness of aim at demand movement | 1. Confirmation of applicability for demand movement  
2. Confirmation of price competitiveness  
3. Examination of engineering competitiveness  
4. Confirmation of reflection of research and development results  
5. Confirmation of new project development capacity  
6. Appropriateness of target model life  
7. Draft of cost target  
8. Prevention of recurrence of important quality problems (Vehicles of same system · similar vehicles) | Business Department General Manager  
Overseas Business Department General Manager  
Engineering Planning Room Chief Engineer  
Product Planning Room Staff | Regulations of New Product Development (Ab 02) | |
| (1)  | Site Planning for Products | Securing of quality which market expects | 1. Set up of proper quality target  
2. Confirmation of development capacity · production capacity  
3. Planning for development schedule  
4. Distribution of target cost  
5. Prevention of recurrence of important quality problems (Vehicles of same system · similar vehicles) | Product Planning Room Chief Engineer  
Product Planning Room Staff | Regulations of New Product Meeting (Hb 06) | |
(3) Standardization to Make Good Products

While what was called "control circle in quality control which was the basis of TQC was conducted taking 4 years from 1961, the concept of control classified by functions was formed in our company, and this concept has become the basis to make good products.

As mentioned before, quality is built up in the processes. In the same way the cost of manufacturing is also built up in the processes. To realize this cooperation of people in the whole company is necessary. To materialize effectively the cost aimed at by the company, besides control in each division coordination of a vector, taking a horizontal contact among various divisions into consideration, is important.

A control system has been set up with quality and cost as two columns as a result of promotion of TQC, and this has been standardized as "quality assurance regulations" and "cost control regulation." A system to control the principles of the company whereby important items to be improved throughout the company are taken up into the principles of the company and developed to each division has been arranged.

The concept of quality control can be indicated as shown in Figure 1. Based on this concept Toyota Motor Corporation has summarized and standardized the basic concept of implementation as a functional concept chart shown in Figure 2. While turning the control circle extensively throughout the company, attention is paid to always turn the control circle on each stage too.

By turning the control circle the level of control progresses and improves. As a result of the accumulation like the above the present image of our company has been achieved, and we hope that we will also keep on turning the quality circle in future.

Control of each production process which is the basis of production is likewise based on turning steadily the control circle of PDCA. "P" of the production process means to make the standard for operation, "D" to do according to the standard for operation, "C" to check and detect abnormality of the processes by the quality of products, and "A" to take an action to pursue a cause for the abnormality and revise the standard for operation to prevent its recurrence.

From the viewpoint of standardization for making good products it is important that the control circle established like the above is steadily turned, and we can say that the fact that revisions are surely made to the standard for operation is a proof of a "live standard."

Toyota Motor Corporation has made the above thoroughly understood by not only supervisors but foremen of the production processes for its complete implementation.
Figure 1 Concept of Quality Control

Figure 2 Figure of Function Concept
(4) Engineering Standardization

As one of the problems we had when we started promotion of TQC in 1961 the preparation for the engineering standards of our company was pointed out. In order to solve this problem the standardization committee covering the whole company was organized, under which 3 divisional meetings of engineering, production engineering and quality were established for the preparation for making the engineering standards of our company.

Standardization concerning quality assurance was to be systematized and arranged on the stages of product planning and designing at the engineering divisional meeting, on the stages of preparation for production and production at the production engineering divisional meeting, and on the entire stages from product planning to sales besides production and inspection at the quality divisional meeting.

As the first step the following outline was made for standardization on each stage:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Standards</th>
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<tbody>
<tr>
<td>Engineering</td>
<td>TR (Toyota engineering regulations)</td>
</tr>
<tr>
<td></td>
<td>TS (Toyota engineering standards)</td>
</tr>
<tr>
<td></td>
<td>TD (Toyota design standards)</td>
</tr>
<tr>
<td></td>
<td>TH (Toyota engineering handbooks)</td>
</tr>
<tr>
<td>Production engineering</td>
<td>TMR (Toyota manufacturing engineering regulations)</td>
</tr>
<tr>
<td></td>
<td>TMS (Toyota manufacturing engineering standards)</td>
</tr>
<tr>
<td>Quality</td>
<td>QR (Quality control regulations)</td>
</tr>
<tr>
<td></td>
<td>QS (Quality control standards)</td>
</tr>
</tbody>
</table>

In the standardization system for the whole company TR, TMR, QR and the like are "work regulations" which can be determined to comply with the needs concerning each work in charge, but through active utilization of divisional meetings their preparation was promoted.

Concerning these engineering standards a department corresponding to a work office of each divisional meeting controls their enactment and revision, and the operation is conducted by the above system even at present.
2. Control of Production Processes

(1) Operation Standards

I mentioned the operation standards for production processes before. Specifically speaking, the production standard of Toyota Motor Corporation designates the operation guidebook and the operation gist book.

The operation guidebook is the basis on which operation supervisors guide the operation of workers in each process, and it is made for each unit of a manufacturing line. Concerning the operation of each process of the line matters such as how to do it and to what attention should be paid are summarized. The guidebook is, so to speak, a collection of knowhow backed by experience on the spot. Supervisors on the spot make it and revise it, as required and keep it.

The operation gist book is made for each process, indicating intelligibly the matters to which attention should be paid when operation is made, and it is posted on the spot. As actual workers perform work for which they are well trained, they do not have to see it each time they work, but by checking the operation gist book controllers and supervisors can confirm whether workers are doing their work observing cautions.

When workers on the spot are trained, supervisors on the spot teach them what are written in the operation guidebook and operation gist book, while they are working, and a supervisor, taking each worker's skills and experience into consideration, plans what process to teach him according to the training schedule, show it to him, and let him do it until he can do it perfectly and give him further guidance based on the result and in this way workers learn their work.

Guidance in this case is what is called "on the job training" and workers master high level skills one by one in this way. Examples of the operation guidebook and operation gist book are shown Figure 3 (11 pages) and Figure 4 (12 pages).

(2) Education of Operation Supervisors

What are necessary for operation supervisors who make the operation guidebook and operation gist book are an engineering instruction book indicating product drawings, construction drawings, and engineering matters in the processes, QC process charts indicating matters and methods for control, QC process tables, knowledge concerning inspection methods for the products, drawings of molds required for the processes, disposition charts of jigs and tools, knowledge of control by measurement, knowledge concerning safety control of workers, knowledge concerning security of facilities, and knowledge of operation analysis and time analysis for control of operating time and knowledge covering other versatile fields. Furthermore, from the position of training workers knowledge and skills concerning "on the job training" are indispensable, and making precise judgment and analysis when abnormality takes place in the processes and taking appropriate countermeasures are an important task for them.

It is necessary for a company to establish various education courses to have operation supervisors acquire these knowledge and skills as well as to establish
necessary education courses for their work stations and give them proper course systematically.

Furthermore, it becomes necessary to have operation supervisors take qualification for particular skills depending on the contents of their work.

Controllers should make efforts to bring up supervisors as mentioned above in each work station and give consideration so that they may show their ability to the full by their experience through the active use of QC circles.

It is necessary to have supervisors experience many things, giving them time in order that they may perform their duty in the production processes. We should raise their knowledge concerning various controls such as quality, quantity, cost, safety and security through actual work so that their responsibility in the production processes may be performed.

They will study not only the maintenance of the production processes but how to improve their operation through the above procedures. As the concept of quality control is the basis of control and improvement of the production processes, special consideration is always paid to its implementation.

A standard for operation is made at the stage of preparation for production, when it involves new processes, and after confirming its result, controllers and supervisors of the production processes establish it for the basis of maintenance and control, and they should turn PDCA with responsibility from here. It is important for them not only to maintain the standard but improve it by grasping problems properly, while it is being implemented.

It happens frequently that a problem in a certain process turns out to be the similar problem in other processes. Concerning the matter like this control skill to make horizontal development promptly is also required of supervisors in charge of production processes.

(3) Relation with Special Control

It is a basic matter to do precise work at the production stage, but a company should not cause hazards to life due to quality or heavy damage to the users of products due to serious malfunction. From such consideration Toyota Motor Corporation is conducting special control. The parts which are directly related to the safety of products or the production processes related to the properties of quality are indicated with a mark \( \text{S} \) (called an S in a triangle), and duty is imposed to assign persons who have received special training as workers in charge of such operation.

It was decided in 1960 to conduct specially control like the above to assure quality, and since then matters requiring such control have been accumulated up to the present.

Exhaust gas of cars is restricted today, and particularly careful control is required concerning the matter by the regulations of exhaust gas as in the case of the safety of products. We have set up a mark \( \text{E} \) (an E in a triangle) contrasting with \( \text{S} \), and special control is conducted in the same manner as the safety of products. According to the law called the Road Transport Vehicle Law cars running
on roads in Japan should pass the inspection stipulated by the country, but there is a system called designated cars whereby car markers give notice to the controlling authorities for permission and they are authorized to perform the inspection in place of the country. The fact that we are making the inspection in place of the country is considered a very important matter, and contrasting with $\triangle$ (called an R in a triangle) has been made, and the same control as the safety of products is conducted.

We, therefore, ensure that the marking as indicated in the operation guidebook and operation gist book is implemented so that problems of quality will not be caused.

Concerning special control for quality assurance it is important to give special consideration to the production processes, and although the method for control differs depending on products, it is important to prepare, maintain and control the standards for operation and to give full consideration when improvement of products and processes is made.

3. Present TQC

(1) Customers First

Toyota Motor Co., Ltd. merged in 1982 Toyota Motor Sales Co., Ltd. which had been separated in 1950 and formed a new company, Toyota Motor Corporation to make a new start. Taking this opportunity, a TQC promotion room was established in the organization in 1983 to promote TQC newly. The aims were to diffuse the idea of customers first throughout the company, to implement the concept based on quality control, and to form a soft constitution of an enterprise for future management.

By making the top managers as well as employees of the company enhance newly their understanding of TQC, issues for Toyota Motor Corporation were expected to be clarified and improved.

As important matters to be implemented fulfillment of QC education at each stage, promotion of TQC to dealers handling Toyota cars and related companies were specified for activities to be made.

At Toyota Motor Co., Ltd. which received the Deming Application Prize in 1965 and the Japan Quality Control Prize in 1970 which was set up for the first time in Japan, although the basis for TQC was remaining, people who had operated it changed largely, and by the merger with Toyota Motor Sales Co., Ltd, we felt the necessity for studying newly the concept of TQC and strengthening TQC activities as an organization. The principle to promote TQC keeping the concept of customers first in our mind has been taken up as No. 1 of the basic principles of Toyota Motor Corporation, being indicated "We always create products superb in quality, price and engineering, thinking of customers first and standing on the original point of making things."
(2) Quality Assurance by All Toyota

Toyota Motor Co., Ltd. which received the Deming Application Prize in 1965 made a slogan "Quality Assurance by All Toyota" in the following year and has been using this slogan continuously as a slogan of the company.

Promotion of TQC is a problem not only of our company but of all the related companies, suppliers, and dealers, and it is difficult to realize quality assurance of cars without concert and cooperation of these companies.

As you well know, various companies belonging to the Toyota group have challenged the Deming Application Prize and the Japan Quality Control Prize and won these prizes in many instances. Our company is backing up these activities and an assembly called a liaison assembly of 12 companies was organized and efforts have been made to raise the level of TQC, including associated companies such as Hino Motors, Ltd. and Daihatsu Kogyo Co., Ltd.

Concerning our suppliers the Toyota Quality Control Prize was created, and by challenging this the constitution of each enterprise has been strengthened. Furthermore, assistance is given through mutual business cooperation, if required.

As to various dealers at the joint policy meeting of Toyota Motor Co., Ltd. and Toyota Motor Sales Co., Ltd., introduction of QC was decided in 1980, and a section in charge of the promotion was set up in the following year centering on the Vehicle Business Section of Toyota Motor Sales Co., Ltd., and it became independent as the Promotion Room in 1982. A model shop was selected in 1981, and trial activities of policy control and QC circles were made to deepen understanding, and a top research meeting by representatives of dealers throughout Japan was held in 1982. In this year QC was also introduced to dealers of forklifts, parts dealers and lend-lease companies.

Since the merger of Toyota Motor Co., Ltd. and Toyota Motor Sales Co., Ltd. in 1983 up to the present promotion of TQC to dealers has been handled by the TQC Promotion Room together with promotion of TQC in the company. The Toyota Dealers' QC Promotion Prize was set up for the companies which took the initiative in taking up QC and made it stay, and these companies have been honored at the 'Toyota Dealers' QC National Meeting, and through these activities efforts have been made for diffusion of QC. As to QC circle activities Japan is divided into 8 to 9 blocks, and a QC circle contest by each group of Toyota dealers is held once a year. We are trying to diffuse QC circle activities even today by giving necessary assistance.

The above is my explanation of TQC at Toyota Motor Corporation. I hope that further efforts will also be made in future by our company as a representative company which has built up TQC in Japan, and I hope that this introduction will be of any assistance to you.
**Figure 3. An Example of Operation Guidebook**

<table>
<thead>
<tr>
<th>No.</th>
<th>Details of Operation</th>
<th>Quality</th>
<th>Vital Points (Success of failure of products, Safety &amp; Easiness)</th>
<th>Net Time Min/Sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Taking out of raw materials</td>
<td>Check</td>
<td>With the right hand</td>
<td>03&quot;</td>
</tr>
<tr>
<td>2</td>
<td>CE- 239</td>
<td>1/50</td>
<td>Excess thinness of the center is dangerous in the LA and GR processes to follow.</td>
<td>11&quot;</td>
</tr>
<tr>
<td>3</td>
<td>LA-1306</td>
<td>Visual</td>
<td>Mount securely to both centers</td>
<td>11&quot;</td>
</tr>
<tr>
<td>4</td>
<td>LA-1307</td>
<td>1/1</td>
<td>Mount securely to both centers</td>
<td>10&quot;</td>
</tr>
<tr>
<td>5</td>
<td>LA-1101</td>
<td>C</td>
<td>22.5 +0.25 33.1 +0.25 Remove cut dust with a dewrecker</td>
<td>12&quot;</td>
</tr>
<tr>
<td>6</td>
<td>DR-1544</td>
<td>Visual</td>
<td>Confirm the state of penetration from the back side</td>
<td>09&quot;</td>
</tr>
<tr>
<td>7</td>
<td>SP- 101</td>
<td></td>
<td>H-22, P-1.5 Clean cut dust on the mounting surface</td>
<td>09&quot;</td>
</tr>
<tr>
<td>8</td>
<td>MM- 122</td>
<td></td>
<td>Place a bush with an oil groove on the circumference up</td>
<td>05&quot;</td>
</tr>
<tr>
<td>9</td>
<td>HP- 657</td>
<td>1/10</td>
<td>Clean the mounting surface</td>
<td>12&quot;</td>
</tr>
<tr>
<td>10</td>
<td>BR- 410</td>
<td>PS</td>
<td>Cinnabar seal ink 80% or more</td>
<td>15&quot;</td>
</tr>
<tr>
<td>11</td>
<td>Cleaner</td>
<td>1/10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mounting of Nipples</td>
<td></td>
<td>Mount by Impact</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Stamp a hallmark</td>
<td>Visual</td>
<td>Half crack is not allowed</td>
<td>17&quot;</td>
</tr>
<tr>
<td>14</td>
<td>Finished Product Platform</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OPERATION GUIDEBOOK**

*Note: Made: February 5, 19__

<table>
<thead>
<tr>
<th>Article No.</th>
<th>4320 1/2 - 86022 (1)</th>
<th>Quantity Required 446 units/day (2)</th>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cycle Time</th>
<th>153&quot;</th>
<th></th>
<th>Standard Quantity on Hand</th>
<th>13 pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard on Hand</td>
<td>0 + + + +</td>
<td></td>
<td>Caution for Safety</td>
<td>Quality Check</td>
</tr>
<tr>
<td>Net Time</td>
<td>1/54&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Time 1' 54"**
## Figure 4. An Example of Operation Gist Book No. 2

### Operation Gist Book No. 2

<table>
<thead>
<tr>
<th>No.</th>
<th>Operation Procedures</th>
<th>Vital Points (Success &amp; failure of products, safety and easiness)</th>
<th>Indicated by Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Switch separately.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Push the button of operation procedures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Indicate item 1 (Pictures of replacement of the grindstone.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Perform 1 and 2 of the replacement procedures of the grindstone.</td>
<td>✤ Point and call</td>
<td>(1)</td>
</tr>
<tr>
<td>5.</td>
<td>Remove the grindstone cover.</td>
<td>✤ Beware of a free hand.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Lift the coolant pipe cover.</td>
<td>✤ Hang the lock on the cover hold so that it may not get loose.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Remove the bolts (8 pieces). Specified tools.</td>
<td>✤ Insert the tool up to its root so that it may not slip.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Remove the flange.</td>
<td>✤ Do not drop it on feet. Beware of hands and feet.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Remove the grindstone.</td>
<td>Tighten the bolts by making 5 or more turns.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Mount the grindstone.</td>
<td>✤ Hold it firmly with both hands.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Mount the flange.</td>
<td>✤ As it is heavy, secure your feet and mount it.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Mount the bolts (8 pieces). Specified tools.</td>
<td>Tightening is to be performed diagonally. The following items are the same with item 7.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Drop the coolant pipe cover.</td>
<td>✤ Beware of a free hand. Confirm that the grindstone does not touch the pipe.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Mount the grindstone cover.</td>
<td>✤ Beware of a free hand. Confirm that the grindstone does not touch the pipe.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Perform 4 and the result of the replacement procedures for the grindstone.</td>
<td>Set the duplicate operation board select to continuous operation.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Switch to indication of the operation</td>
<td>Switch to (3) in (1) Indicated by Figures.</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Switch to continuous activation.</td>
<td>✤ Point and call</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- Access to pictures showing the replacement of the grindstone is made by (1) and (2).
- Hold the grindstone firmly with both hands so as not to drop it.
- Tighten the bolts by turning 5 to 6 times.
Standardization and Quality Control on Factory Management (II)

— An Experience of Promotion on Company Standardization and Quality Control in The Furukawa Electric Co., Ltd. —

by Masaru SEKIGUCHI
Director of Eiko Development Co., Ltd.
Past General Manager of Quality Control Division of The Furukawa Electric Co., Ltd.

1. Outline of Furukawa Electric Company

1.1 General Information

Established: 1884
Number of employees: 7,072 (Sept. 1989)
Main products: Power cables, telecommunication cables, optical fibers, rolled copper, plastics and aluminium products.

Plant & Laboratory: 8 plants and 5 laboratories
Sales amount: 525,694 Million Yen (1988)

1.2 History on Quality

Our history of 100 years has been based on the principle of "producing and supplying quality products and offering the maximum service to customers". This principle has been maintained by our sustained efforts to promote creativeness and inventiveness and is well manifested in our quality control over all products.

In 1950 our president urged the company staff of all departments to perform quality control according to the control chart method. As a result, a series of items were worked out for cultivation of QC engineers, the company-wide QC organization practising plan. These have greatly helped to promote the rationalization of our production. In recognition of its excellent quality control, Furukawa Electric was awarded the world famous Deming Prize in 1952.

In 1964 a trans-pacific telephone communication line was installed, using unarmoured coaxial submarine cables. The copper strip (about 1,500 tons) used for the conductor of this cable was required to be of very high quality and was deemed to be difficult to manufacture except in the United States and Europe. But we successfully manufactured such copper strip, meeting the requirements of quality, quantity, and delivery time.

Furthermore in 1983–1984, 138 kV oil-filled submarine cable were supplied and installed in Southeast Alaska, U.S.A.
This installation work is unprecedented in that the submarine cable system was laid under many difficult site conditions such as a 350 m-deep glacier-eroded canal and the mouth of a river flowing from the continent and that sixteen oil-filled submarine cables, four each in four routes, were installed in a short three-week period in a single project. Through our excellent quality control and development of many new techniques, we completed the cable installation successfully drawing the intense interest of the American people concerned.

The above two examples are the results of our organic combination of engineering, quality control and other production control activities.

2. Basic Concept on Management

2.1 Principle of Management and Mission

FURUKAWA’S products are all made and supplied based on the following "Principle of Management and Mission".

2.1.1 Principle of Our Management

We, Furukawa Electric, based on the respect for human relationship and mutual trust, contribute to the making of a peaceful, happy, and affluent society by executing our business activities in an excellent manner with all corporate power combined through accommodating ourselves to changes in the social environment.

2.1.2 Our Responsibilities

(1) We, aware of being a member of the society, work to contribute to improvement of the social welfare and build an amicable coexistence with local communities on the foundations of mutual understanding and harmonious relationship.

(2) We work to develop ourselves as an enterprise having a strong corporate structure and always provide products and services of better quality which the demand of the markets both at home and abroad.

(3) We encourage all our members to develop their capabilities and participate in the operation of the company, thereby giving them something to live for and helping them cultivate themselves.

2.1.3 Region of Our Business

(1) Supply of products and systems related with the transmission, conversion, and processing of energies and information.

(2) Supply of industrial and household-related materials centering on nonferrous metals and chemical products.

(3) Undertaking based on those mentioned above, which are instrumental to creation of better living environments.
2.2 Management Policy

2.2.1 Basic Management Policy

The Basic management policy was settled in the year of 1983 by the company president as "Positive Management to Challenge Changes".

The main points for implementation of this policy were defined as follows.

i) Promotion of business diversification
ii) Maximum work efficiency
iii) Expansion of overseas business

All employees were required to keep the following points in mind.

(1) Place importance on strategy
(2) Forming of active groups
(3) Quick response to situation
(4) Making full use of creativity

2.2.2 Management Policy in 1989

The management policy the president laid down for 1986 aims at fulfilment of the following two objectives.

(1) Effective execution of the NF-65 program
(2) Quality-conscious improvement of technological capability

It goes without saying that our business can hold itself and grow further only by supplying products and services attractive to users in quality, price, and delivery. The major goal of the NF-65 is for us to maintain a predominant position over all competitors in respect of "quality" in a broad sense of meaning, covering products, price (production cost), delivery (capacity), etc. Attainment of this goal is indispensable to our future development.

3. Organization and Systematic Promotion of Quality Control

3.1 The Central Quality Control Committee

For all department and people in our company to be able to engage in the quality control activities systematically and to make sure of quality assurance of our products, we have organized the Central Quality Control Committee at the Head Office as the center of company-wide quality control promotion to ensure and improve the quality level of our products and customer services at all times. It is a supreme organ to deliberate the matters related with quality, consisting of the senior managing director in charge of quality control acting as chairman and all of the senior board members serving as the committee members.

With an aim at securing smooth operation of the company quality assurance system, the Central Quality Control Committee establishes and enforces quality control policies, promotes quality control education and preparation of quality standards, and inspects how they are being practised.
The ordinary meeting of the committee has been held once a month, and deliberate over policies on the inspection of items mentioned below and their executing condition with regard to the quality of our products.

(1) Promotion of the assurance, improvement and economy of quality.
(2) Set-up of the quality standard.
(3) Set-up of company standards relating to the quality.
(4) Survey on market quality and transaction to claims.
(5) Education on Quality Control, Industrial Engineering, Operations Research and Standardization.
(6) Management of other problems concerning the quality.

3.2 Quality Assurance System

It is our basic concept that the purpose of quality control promotion is to assure the product quality and the service quality which satisfies customers and the public requirement.

The quality assurance system organized in our company is managed smoothly in all functions of each department. A schematic diagram of the Company-wide Quality Control Organization Hierarchy is shown in Fig. 1, and the Quality Assurance Flow Chart is shown in Fig. 2.
Fig. 1. Quality Control Organization Hierarchy
4. Company-wide Quality Control Activities

4.1 Promotion of Management by Policy on Quality Control Activities

(1) Basic Concept of Quality Control

Basic quality control policy is, "BE AWARE OF SELLING QUALITY AND MAKE IT THOROUGHLY REFLECTED IN YOUR DAILY WORK," and it means, "the Quality and the Reliability of our products are bought by customers, so we have a responsibility to make product with the perfect quality and the entire reliability". It is our supreme reliability improvement for all products which are always the best in performance and quality in the domestic and overseas markets.

(2) Yearly Quality Control Policy in 1986

A yearly quality control policy is presented at the beginning of the fiscal year. This is distributed in writing to each department and at the same time a poster is put up at the office and job sites of each department for a year. The policy of the year of 1986 is "MAKE SURE TO ATTAIN THE GOAL OF NF-62 WITH STRESS ON QUALITY."

Out president has given the instructions that "we must set the basic goal of both Furukawa Electric and Furukawa Aluminum at more diversified, more effective, and more internationalized operations and promote active management to challenge changes in business world."

In line with this policy we wish to build a solid basis for a company-wide quality control system under the above slogan following the previous year in an effort to promote effective quality control and make a more powerful operational structure.

With good understanding of this year's company quality control policy, all of us working at Furukawa Electric and Furukawa Aluminum will make concerted efforts to promote and develop company-wide quality control, aiming at realization of "world's best quality" in our products and services.

(3) Development of the Quality Control Policy

In order to make clear the aforesaid policy and the reflection on last year's quality control policies of each department are set up and broken down into several items, which have been discussed and settled depending on the priority in the department. Then the items are converted into definite plans for execution. These plans are concreted objectives, specified the schedule and appointed executing sections for development. Then the contents are reported and promised to achieve to the ordinary meeting of the Central Quality Committee by the general managers of each department.

After the permission by the Central Quality Committee, the plans should be executed. The chief of each section should check the executing condition of each plan in his daily work, and reports to the manager of the department, division or plant at the quality meeting, which is held every month, and advises on the problems about the disturbance to success or the cause of behind the schedule. The result are reported to the general manager of the department immediately.
The executing condition of each plan is inspected by the general manager of each department itself in the quality month of November every year for follow-up. The result of this follow-up is also reported to the ordinary meeting of the Central Quality Committee and, is naturally, reflected in the quality control policies for the subsequent years.

The quality control level in our company has been improved with repetition of PDCA (Plan, Do, Check and Action) as mentioned above.

4.2 Education of Quality Control

In general, education is most important to develop the quality control activities, and the Central Quality Committee has set the guideline of quality control education.

4.2.1 Basic Principle of Quality Control Education

Education of quality control has to apply all people of FURUKAWA including the subsidiary companies and should not be restricted to only acquisition of knowledge. It also requires repeated hard study through practice in daily work as a systematic and continuous undertaking.

4.2.2 Objectives of Quality Control Training

(1) To find problems by oneself and foster the ability to carry out improved activities on one's own responsibility (Self-development).

(2) To foster the ability to draw up and implement objectives and plans, examine and evaluate results, and apply the required measures and treatment.

(3) To study the statistical method, analyse and evaluate the phenomena depending on the actual observation and to foster the ability to efficiently solve problems.

(4) To promote the ability to set the company standards, and to foster the ability to keep the standards.

4.2.3 Implementation of Quality Control Education and Training

(1) Planning

The education and training plan must be determined on the basis of a long range viewpoint.

An education and training plan should be drawn up, as a rule, for each of the following organizational levels.

1. Managing directors and executive managers
2. Managers of departments and sections
3. Staff
4. Foremen (Workshop foremen, working foremen and those acting as their substitutes)
5. General employees (Manufacturing department workers and general office workers and skilled workers)
6. Persons in charge of marketing and persons in charge of materials
7. New employees (Including temporary employees)

To study the multivariate analysis will be implemented under the guidance of outside consultants as study meetings mainly for case study.

(2) Maintaining and Improving Effectiveness of Education and Training

As a rule, the training and guidance of subordinate personnel should be carried out on the responsibility of the direct superior in the organization. The superior must have the subordinate personnel apply what learned from the education and training to their daily work to foster competence and attain effective quality control to contribute to the growth of the company's business. The superiors are responsible for effective promotion of the studying and training for subordinate personnel, and must provide proper advise and guidance for the purpose.

(3) Evaluation

Evaluation of the education and training should not only concern the degree of understanding of itself, but should also include the performance, improvement and achievement in the daily work.

4.3 QC-Circle Activities

The QC-Circle activities is now spread over the company-wide, and it is indispensable to promote the quality control level in the factory.

An example of the structure, aim and scheme of QC-circle of our company is shown as follows:

(1) The structure of QC-circle

A QC-circle formed at the lower end of our organization consists of either a "work unit" or a "sub-group" of the work unit.

(2) Aim of QC-circle

1. Studies the method of achieving the workshop target (by group members)
2. Improves the work method necessary for reaching the target
3. Makes all-out efforts to attain the target
(3) The scheme of QC-circle
4.4 Quality Control Diagnosis (Audit)

There are three types of Quality Control Audit which is applied in our company.

(1) Audit by top management.
(2) Audit by the general manager of department.
(3) Inter plant mutual audit by the quality assurance section chief.

4.4.1 Audit by Top Management

The executive members are in the position of leading and promoting quality control activities. They are responsible for deciding on the top policy of management, so the aim of the audit by top management is to see whether the policy and the plan are being realized on schedule and to see whether any corrective actions by the executive members are required.

The items to be taken up for manufacturing process audit are as follows:

(1) Attainment of the company's quality policy.
(2) Attainment of the quality control program.
(3) Solution of the important quality problems.
(4) Reduction of defects
(5) Amount of stocks.
(6) QC Circle activities.
(7) Recent tendency for the amount of products.
(8) Investment in manufacturing facilities.
(9) Reduction of manufacturing cost.
(10) Productivity per worker.
(11) Development of new products.

4.4.2 Audit by the General Manager of Department

In order to evaluate and to promote the quality control activities, mainly the aim of attaining the quality control program which has been set and reported to the Central Quality Committee at the beginning of the fiscal year, the quality control audit by the general manager of each department have been enforced in November, the Quality Month.

After the Quality Month, the result is reported at the ordinary meeting of the Central Quality Committee by the general manager of the department.

4.4.3 Inter-plant Mutual Quality Control Audit by the Quality Assurance Section Chief

To promote of standardization and improvement of quality control condition and quality assurance level, the inter-plant mutual audit system is enforced every year.

The mutual quality control audit is carried out by a quality control audit team which is composed of the secretary of the Central Quality Committee and the managers of section chief rank, mainly the quality assurance section chief who is the representative of each factory or the profit center.
The result of the mutual quality control audit is also reported to the Central Quality Committee. The purpose of this "Quality Audit" is promotion of mutual enlightenment and mutual understanding. The mutual level of QC know-how is raised through discussion. Any quality audit that dampens the willingness to do better work will have an adverse effect. A check list, prepared beforehand, is used for this quality audit. Since a general all-round audit would only be a laborious but fruitless work, the audit is on a priority items basis. This list has about 100 check point items and is an intensive know-how list.

5. Other Activities Supporting Company Standardization and Quality Improvement

5.1 TPM Activities

The TPM (Total Productive Maintenance) activity started about 12 years ago and is aimed at the prevention of machine failure and increasing of production efficiency. Besides, this activity promotes to keep the machine and the office clean. The rate of the defect on machines decreased to about 1/30 in the last eight years.

5.2 FR Suggestion System

Our suggestion system began about 35 years ago, and it has been carried on at the factory. 11 years ago, we organized a committee to promote the suggestion system by the top policy. After that the system was expanded into company-wide activity, and named "FR Suggestion System."

In "FR", "F" stands for FURUKAWA and "R" represents "Refreshment", "Reformation" and "Rationalization."

The purpose of this activity is to improve the working condition, raise the morale, activate the organization, and increase the efficiency of every job by ensuring participation of all members of our company.

In 1978, before the "FR" suggestion system was started, the mean value of the number of suggestions in the factory was less than 1.0/person per annum, however it was increased to more than 30/person per annum in 1984. The yearly profit by the "FR" suggestion system is about 1.5 - 2.0 billion yen.

6. Measures Required by Factories Desiring JIS-Marking Approval

Under the JIS marking system, the relevant minister approves manufacturers to use the JIS mark, on condition that they have the ability to manufacture or process the products of which quality and performance characteristics are at or above the levels specified in the JIS concerned with the products. In this system, the authorized assessors does not merely check the manufactured or processed products to determine whether they meet the requirement of JIS, but also investigate the applicant's entire manufacturing system to determine whether the applicant conducts company standardization and quality control activities, which produce satisfactory results, and is technically capable of consistently producing products which conform to the requirements of the relevant JIS. That is to say, the assessors perform their investigation by not employing "product-inspection type" but employing "factory-assessment type". Upon reception of the application, the minister despatches assessors to the applicant's factory. These assessors, at the site, confirm the contents in the submitted application, and
in order to determine whether the factory can consistently produce the products conforming to the relevant JIS under a stable condition on a long-term basis, they examine whether company standards maintained by the factory, implementation of quality control programmes, and records maintained and others meet the prescribed requirements, in accordance with "the matters to be investigated for the JIS-marking approval" prescribed in the notification of the relevant ministries, and the particular provisions relating to the investigation items stipulated for each designated commodity or processing technique.

The subjects to be investigate prescribed in the notification are as follows:

i) Manufacturing Facilities or Processing Facilities

ii) Inspection Facilities

iii) Inspection Method

iv) Quality Control Methods

v) Further Technical Manufacturing Conditions Necessary to Maintain the Qualities of Products

The following items to which special attention should be paid in the course of preliminary operations for the JIS-marking factory-assessment; and can be applied not only to the case of "designated commodity" but also to the case of "designated processing technique":

(1) Systematic management of company standardization and quality control

   i) Policy and organization for promoting the activities

   ii) Assigning duties and defining responsibilities and authorities

   iii) Education and training

   iv) Establishment of quality assurance system and development of company wide quality control (TQC) activities.

(2) Making an appointment of a response person for industrial standardization and quality control

   To perform the following duties:

   i) Formation and promotion of plans related to company standardization and quality control.

   ii) Overall supervision of establishment and revision of company standards.

   iii) Evaluation of the quality level of commodities or processed products.

   iv) Providing guidance, advice and adjustment among the various departments for enforcing company standardization and quality control in each process.

   v) Disposition of abnormalities occurring in a process and of complaints, and furnishing instruction, guidance and advice on measures to be taken.

   vi) Carrying formed education and training plans for employees on company standardization and quality control.

   vii) Offering guidance and advice pertaining to control of subcontractors.
(3) Preparation for obtaining JIS-marking approval
   i) Material useful for application for the approval
   ii) Comprehension of the contents of JIS and investigation items
   iii) Evaluating product quality levels
   iv) Formulation of the product standards
   v) Development of the quality control process chart
(4) Formation of manufacturing standard
(5) Control of raw materials, auxiliary materials and parts
(6) Control of manufacturing process
(7) Maintenance of facilities
(8) Management of sub-contract work
(9) Inspection of finished products
(10) Dealing with non-conforming products and complaints about them
(11) Packing and product marking
(12) Traceability
(13) Amendment control

7. An Experience of Awarded as “Factory Excellent Practising Industrial Standardization and Quality Control

   The Bare Wire Plant in Chiba prefecture of our company is a JIS-Marking approved factory, and has been manufacturing copper rods and wires for electrical use by continuous casting and rolling process, since 1971. Of all products of our plant, a copper wire for very fine wire in particular is highly rated by users for its excellent drawability.

   In 1985, the plant was given Director General of Tokyo Bureau of International Trade and Industry Award as an outstanding industrial standardization and quality control.
Fig. 4. Electrical Copper Wire Manufacturing Process

[Production of copper rod]

Electrolytic copper (Cathode) → Melting → Casting → Rolling → Coiling → Copper rod

[Production of electrical copper wire]

Copper rod → Drawing → Coiling → Hard copper wire

Copper rod → Annealing → Coiling → Soft copper wire
Principle of Management

[President's Managerial Guideline]
"Positive management to challenge changes in the business world"

1. Improvement of operational efficiency, business diversification and internationalization by a medium-term plan
2. Improvement and fortification of R&D system

[Guideline on Quality Improvement Program]
Let's bring up technologies and quality acceptable throughout the world.

[Company Quality Control Policy]
"Be aware of selling quality and make it thoroughly reflected in your daily work" — Basic policy
"Anticipatory technological development, quick response, acquisition and improvement of world's best quality"

[Quality Control Policy of Bare Wire Division]
1. Make a deep analysis of the present condition and work out well-thought-out measures.
2. Keep an accurate cycle of PDCA on a fixed schedule.
3. Push "standardization" that permits working at ease.

[Quality Control Policy of Chiba Bare Wire Plant]
1. Keep a rapid cycle of PDCA based on "3-GENism."
2. Push "standardization" and follow what were decided.
3. Promote policy management by a priority system.

* "GEN" is a Japanese character " 現 " and "3-GEN" means
  ① on the scene ( 現場 ),
  ② materials, products and equipment in operation ( 現物 ) and
  ③ realistic approach and solution ( 現実的 ).

2-2-18
Table 1. Meetings and Checking

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Sponsor</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Quality Committee</td>
<td>Senior managing director in charge of technology</td>
<td>Once a month</td>
</tr>
<tr>
<td>Cross QC diagnosis</td>
<td>Central Quality Control Committee</td>
<td>Once a year *</td>
</tr>
<tr>
<td>Division Quality Committee</td>
<td>General Manager of Bare Wire Division</td>
<td>Once a month</td>
</tr>
<tr>
<td>Quality diagnosis by General Manager</td>
<td>General Manager of Bare Wire Division</td>
<td>Once a year</td>
</tr>
<tr>
<td>Goal promotion meeting</td>
<td>General Manager of Bare Wire Division</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Plant Quality Council</td>
<td>Manager of Bare Wire Plant</td>
<td>Twice a year</td>
</tr>
<tr>
<td>QC diagnosis by Plant Manager</td>
<td>Manager of Bare Wire Plant</td>
<td>Twice a month</td>
</tr>
<tr>
<td>Workshop QC meeting</td>
<td>Manager of Quality Assurance Section</td>
<td>Twice a month **</td>
</tr>
<tr>
<td>QC case study meeting</td>
<td>Manager of Quality Assurance Section</td>
<td>In each case ***</td>
</tr>
</tbody>
</table>

- Cross diagnosis among plants by the inspector of Central Quality Control Committee and managers of all quality assurance sections.
- Thorough dissemination of instructions from upper echelon
- Investigation into cause of user's complaint and defective quality and study of remedial measures
Fig. 6. Promotion of QC Activities

**Head Office**
- Company-wide QC course setting
- Company-wide coordination
- Guidance service
  - Company QC policy
  - Standardization
  - Cross QC diagnosis

**Bare Wire Division**
- Division's QC course setting
  - Division Manager's QC policy
  - Policy on product quality
  - Standardization of QA system development
  - Utilization of quality information in the market
- Coordination for important problems
  - Standardization

**Bare Wire Plant**
- Plant's QC course setting
  - Policy confirmation, planning, and follow-up
  - Confirmation of product management
  - Defining of important problems and follow-up
  - Standardization and QC inspection
- Coordination for important problems
- Education
- Standardization

**Staff Group**
- Settlement of important problems
  - Process analysis and improvement
  - Improvement of our own technologies
  - Systematized process checking and establishment of effective inspecting methods
- Standardization
  - Deeply rooted standardization

**Workshop**
- QC work
  - Practice and utilization, feedback
  - Dealing with abnormalities, skill control education
  - Improvement of morale

Central Quality Committee
Experts meeting

Quality Committee of Bare Wire Division
Subcommittee

Plant Quality Council

Line-Staff Liaison Council (Production Section)

Work site QC Workshop meeting (QC circle)
<table>
<thead>
<tr>
<th>Objective of education and training</th>
<th>Staff engineer and supervisors (persons)</th>
<th>Line operators (persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC education</td>
<td>QC seminar (2)</td>
<td>QC correspondence course (13)</td>
</tr>
<tr>
<td></td>
<td>Design of experiment seminar (3)</td>
<td>Study meeting on PDCA in action programs (10)</td>
</tr>
<tr>
<td></td>
<td>Study meeting on multivariate analysis (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study meeting on new seven tools for QC (14)</td>
<td></td>
</tr>
<tr>
<td>Increase of efficiency on process</td>
<td>Study meeting on invention development (20)</td>
<td>Training on cost reduction activities (12)</td>
</tr>
<tr>
<td></td>
<td>Training on T Co.'s production system (16)</td>
<td>Training on T Co.'s production system (20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training of maintenance section (15)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training between plants (12)</td>
</tr>
<tr>
<td></td>
<td>Mutual training in the company (10)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Equipment study meeting (14)</td>
<td>Education and training according to the hierarchy (10)</td>
</tr>
<tr>
<td></td>
<td>Wire drawing study meeting (7)</td>
<td></td>
</tr>
<tr>
<td>Kind of standard</td>
<td>Contents</td>
<td>Issued by</td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Product standard</td>
<td>Specifies the target values of properties (components, contents, mechanical and physical characteristics), dimensions, shape, etc.</td>
<td>General manager of engineering department</td>
</tr>
<tr>
<td>Inspection standard</td>
<td>Method for testing and inspection of products, semifinished products, and materials, rating method, testing lot, test items, sampling, indication of acceptance and non-acceptance, handling of unaccepted lot, reporting, etc.</td>
<td>Manager of quality assurance section</td>
</tr>
<tr>
<td>Materials standard</td>
<td>Quality, shape, etc. of raw materials, auxiliary materials, and parts</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>Technical standard</td>
<td>Technical conditions and bases for production, method of management, etc.</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>Work standard</td>
<td>Main work conditions, methods, procedures, and management in production, emergency measures, reporting, etc.</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>(Work Card)</td>
<td>Excerpts from the work standard (manufacturing conditions as the basis for each product and process)</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>(Quality Card)</td>
<td>Excerpts from the inspection standard for each product. Specified values of properties for individual products, sampling, points of quality</td>
<td>Manager of quality assurance section</td>
</tr>
<tr>
<td>Packing standard</td>
<td>Matters concerning the packing of products and semifinished products, packing method, packing material, marking method, etc.</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>Kind of standard</td>
<td>Contents</td>
<td>Issued by</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Production process standard</td>
<td>QC process chart of controlling items, values, method, and recording for each process</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>Machine and equipment control standard</td>
<td>Method for satisfactory maintenance (inspection, preventive maintenance, spair parts control, etc.) of the production facilities</td>
<td>Manager of production engineering section</td>
</tr>
<tr>
<td>Measuring instrument control standard</td>
<td>Method for satisfactory maintenance (inspection, testing, repair, etc.) of measuring instruments</td>
<td>Manager of quality assurance section</td>
</tr>
<tr>
<td>Supporting work standard</td>
<td>Matters concerning the methods and procedures of all supporting clerical work for products and production</td>
<td>Section manager in charge</td>
</tr>
</tbody>
</table>
Fig. 7. TPM Activities System of Bare Wire Plant

TPM activities:
Improvement of overall efficiency of Manufacturing Equipment

Making of "perfect production line"
(no trouble, no defect, no loss, no intermittent operation)

Improvement of yield and rate of operation

Subcommittee activities
Individual improvements

- Promotion of save energy
- Elimination of chronic trouble
- Training on spontaneous maintenance
- Training on quality skill
- Improvement of indirect work efficiency
- Unattended operation

Production, maintenance

- Spontaneous maintenance
- Components control
- MQM control Unit foremen action program
- Equipment 5S
  - Overall check
  - Spontaneous inspection
  - Spontaneous control
- Routine spontaneous maintenance

Preventive maintenance

- Maintenance and improvement of quality and accuracy of equipment
- Upgrading of diagnosing technique
- MTBOF - MTTR
- FTA - FMEQA
- Planning, improved maintenance

5S, Control by sight

Upbringing of able workers by training

LCC design
MP design
Information
Evaluation
Pilot running control
Zero defects start

2-2-24
9. Effect

9.1 Tangible effects

Tangible effects related to abnormality of quality and QC circle activities are shown in Fig. 8.

9.2 Intangible effects

1) Promotion of policy management is beginning to breed an operational structure in which much weight is given to planning and processes.

2) All the members of the plant have become familiar with QC-oriented approaches (utilization of "3-GENism" and statistical method). Production activities with a management by PDCA control cycle have taken root in the plant.

3) Education and training has advanced workers' abilities and improved their morale, thus invigorating the operating of all workshops of the plant.
Fig. 8. Tangible Effects

Number of complaints from outside (monthly average)

Number of cases of quality defect found (monthly average)

Fulfilled number of subjects of circle activities

Number of suggestions for improvements (Yearly average per person)

1980 81 82 83 84 85 86
(Fiscal year)

1980 81 82 83 84 85 86
(Fiscal year)
SEMINAR ON
INDUSTRIALIZATION THROUGH
STANDARDIZATION
AND
QUALITY CONTROL

Total Quality Control
– Features of TQC and Deming Prize in Japan –
Speaker: Mr. Yozo MUKAWA
Professor of Science and Engineering Department of
Chuo University
Time: 9:00 – 11:30

How to Promote Standardization and Quality Control
by Audio Visual
Speaker: Mr. Kanji KAKINUMA
Executive Director of
Japanese Standards Association
Time: 11:30 – 12:00

Panel Discussion
Leader: Mr. Yozo MUKAWA
Panelists: Mr. Zenzaburo KATAYAMA, Mr. Masaru SEKIGUCHI,
Kanya SINSAKUL, Dr. Pakorn ADULBHAN,
Mr. Cheovet YIMSIRIKUL
Time: 13:30 – 16:00

23rd – 25th January 1990
The Landmark Hotel and Plaza, Bangkok
1. The History of Quality Control in Japan

Quality control in Japan began after the end of the Second World War.

Introduced from the United States, it was particularly through the guidance of Dr. W. Edward Deming that it became rapidly accepted by large and small businesses alike.

Laws for the promotion of industrial standardization (related to the Japanese Industrial Standards: JIS) as well as the JIS mark certification system also played important roles in the evolution of the quality control concept in Japan.

At the beginning of the introduction of the quality control in Japan, it tended to application of statistical methods which is not the true aim of quality control, and at that time, emphasis of inspection was considered important in companies.

By the guidance of Dr. Deming at 1950, the true aim of quality control has became to be known and at the same time the importance of production control has begun to be recognized. Through these changes and developments of quality control, qualities of products have been improved gradually. That is to say, "Quality is not assured by emphasis of inspection, but built-in quality should be done during production process." This view has been penetrated.

The Japanese-style quality control began to draw attention shortly before 1960 and it gave rise to what is today known as company-wide quality control (CWQC), or often referred to as total quality control (TQC).

In JIS Z 8101, "Glossary of Terms Used in Quality Control", CWQC is defined a part of definition on quality control as follows:

A system of means whereby the qualities of products or services are produced economically to meet the requirements of the purchaser.

"Quality control" is sometimes called "QC" for sort.

In addition, since modern quality control adopts statistical techniques, it is sometimes especially called tokeiteki hinshitsu kanri ("statistical quality control", and "SQC" for short).

In order to perform quality control effectively, throughout all phases of the enterprise activities such as market survey, research and development, planning of product, design, production readiness, procurement and subcontract, manufacture, inspection, sales and after sales servicing as well as finance, personnel affairs and indoctrination, whole
personnel including from the executives down to the managers, foremen and workers are required to participate and collaborate.

The quality control activities conducted in such way is called *zenshateki hinshitsu kanri* ("company-wide quality control", and "CWQC" for short) or *sogoteki hinshitsu kanri* ("total quality control", and "TQC" for short).

QC circles were first introduced in 1962 and developed rapidly thereafter. However, these QC circles refer to the activity taking place at the lower levels of organization within a company and although they make an extremely valuable contribution to CWQC, they should not be confused with CWQC itself.

The number of QC circles and QC circle members which were registered at QC circle secretariat are 296,816 and 2,338,000 respectively as of 1989-10-03. Furthermore, the number of unregistered QC circles seems to be double or triple.

QC seminars and meetings for executives and managers are actively organized. Now in most companies, TQC has become administration of company itself.

In this way, quality control started at production departments in manufacturing industries, it has became company-wide activities as TQC and further it is becoming group-wide TQC including associated companies. This movement is spreading over the construction, service and software industries.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>ITEM</th>
<th>Changes in activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1924</td>
<td>Research on QC begins. (W. A. Shewhart)</td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>W. A. Shewhart: &quot;The Economic Control of Quality of Manufactured Products&quot; is published.</td>
<td></td>
</tr>
<tr>
<td>1941 - 42</td>
<td>ASA Z1 - 1, 2.3 is enacted.</td>
<td></td>
</tr>
<tr>
<td>1945</td>
<td>World War II ends.</td>
<td></td>
</tr>
<tr>
<td>1946</td>
<td>QC is introduced by the staff of GHQ and CCS.</td>
<td></td>
</tr>
<tr>
<td>1948</td>
<td>QC seminars begin in Japan.</td>
<td></td>
</tr>
<tr>
<td>1949</td>
<td>The law, Japanese Industrial Standard (JIS) is enacted.</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>W. E. Deming's first visit to Japan - holds an 8-day course in quality control.</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>Japanese Agricultural Standard (JAS) is enacted.</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>&quot;Statistical Quality Control&quot; (magazine) is launched.</td>
<td></td>
</tr>
<tr>
<td>1951</td>
<td>Deming Prize is established.</td>
<td></td>
</tr>
<tr>
<td>1951</td>
<td>The first quality control congress is held.</td>
<td></td>
</tr>
<tr>
<td>1953</td>
<td>JIS Z 9001 rules for sampling inspection are established.</td>
<td></td>
</tr>
<tr>
<td>1954</td>
<td>J. M. Juran's First visit to Japan - holds a 10-day management training seminar.</td>
<td></td>
</tr>
<tr>
<td>1954</td>
<td>JIS Z 9021 quality control chart method is enacted.</td>
<td></td>
</tr>
<tr>
<td>1958</td>
<td>The first National Conference on Standardization is held.</td>
<td></td>
</tr>
<tr>
<td>1958</td>
<td>November and December become campaign period for Promotion of Industrial Standardization.</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>November is designated as &quot;Quality Month&quot;.</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>&quot;Quality Control for the Foreman&quot; (magazine) is launched.</td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>The first QC circles are formed.</td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>QC Circle Headquarters are established.</td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>The first foremen's congress is held.</td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>The first top management conference is held.</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>The first quality control symposium (QCS) is held.</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>The first national Q-S conference is held.</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>Promulgation of the Basic Consumer Protection Law.</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>The International Conference on Quality Control (ICQC '69 Tokyo) is held.</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>The Japanese Society for Quality Control is established.</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>The First International Conference on QC Circles is held.</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>The International Conference on Quality Control (ICQC '87 Tokyo) is held.</td>
<td></td>
</tr>
</tbody>
</table>

3-1-3
2. Characteristics of Company-Wide Quality Control in Japan

Since 1965, Quality Control Symposiums (QCS) have been held in Japan twice a year and people from academia, QC managers and leaders in the field of quality control have participated.

The International Conference on Quality Control (ICQC) was held in Tokyo for the first time in 1969. On that occasion, the Ninth Quality Control Symposium was held on the theme of "Problems and Characteristics of Quality Control in Japan". This symposium dealt with the following six topics:

1. Company-wide quality control;
2. QC circle activities;
3. Quality control audits;
4. Utilization of statistical methods;
5. QC education and training;
6. Activities for promoting quality control nationwide.

When the International Conference on Quality Control was held again in Tokyo in 1987, the Quality Control Symposium in June dealt with the same theme and the following ten topics:

1. President-led QC activities in which all departments and all personnel participate;
2. Top priority consistently assigned to quality by management;
3. Policy dissemination and control by delegation;
4. QC audits and their implementation;
5. Quality assurance activities ranging from planning and development to sales and service;
6. QC circle activities;
7. QC education and training;
8. Development and implementation of QC techniques;
9. Extension of applications from manufacturing to other industries;
10. Nationwide QC promotion activities.

3. Checklist for the Deming Application Prize

The Deming Application Prize is awarded to a company which is recognized to have achieved outstanding results in applying total quality control.

The attached checklist can be used for evaluating qualification for this prize.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PARTICULARS</th>
</tr>
</thead>
</table>
| 1. POLICY | (1) Policies pursued for management, quality, and quality control  
(2) Method of establishing policies  
(3) Justifiability and consistency of policies  
(4) Utilization of statistical methods  
(5) Transmission and diffusion of policies  
(6) Review of policies and the results achieved  
(7) Relationship between policies and long-and short-term planning |
| 2. ORGANIZATION AND ITS MANAGEMENT | (1) Explicitness of the scopes of authority and responsibility  
(2) Appropriateness of delegations of authority  
(3) Interdivisional cooperation  
(4) Committees and their activities  
(5) Utilization of staff  
(6) Utilization of QC Circle activities  
(7) Quality control diagnosis |
| 3. EDUCATION AND DISSEMINATION | (1) Education programs and results  
(2) Quality control-consciousness, degrees of understanding of quality control  
(3) Teaching of statistical concepts and methods, and the extent of their dissemination  
(4) Grasp of the effectiveness of quality control  
(5) Education of related company (particularly those in the same group, subcontractors, contractors, and distributors)  
(6) QC Circle activities  
(7) System of suggesting ways of improvements and its actual conditions |
| 4. COLLECTION, DISSEMINATION AND USE OF INFORMATION ON QUALITY | (1) Collection of external information  
(2) Transmission of information between divisions  
(3) Speed of information transmission (use of computers)  
(4) Data processing, statistical analysis of information and utilization of the results |
| 5. ANALYSIS | (1) Selection of key problems and themes  
(2) Propriety of the analytical approach  
(3) Utilization of statistical methods  
(4) Linkage with proper technology  
(5) Quality analysis, process analysis  
(6) Utilization of analytical results  
(7) Assertiveness of improvement suggestions |
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PARTICULARS</th>
</tr>
</thead>
</table>
| 6. STANDARDIZATION         | (1) Systematization of standards  
(2) Method of establishing, revising, and abolishing standards  
(3) Outcome of the establishment, revision, or abolition of standards  
(4) Contents of the standards  
(5) Utilization of statistical methods  
(6) Accumulation of technology  
(7) Utilization of standards |
| 7. CONTROL                 | (1) Systems for the control of quality and such related matters as cost and quantity  
(2) Control items and control points  
(3) Utilization of such statistical control methods as control charts and other statistical concepts  
(4) Contribution to performance of QC Circle activities  
(5) Actual conditions of control activities  
(6) State of matters under control |
| 8. QUALITY ASSURANCE       | (1) Procedure for the development of new products and services (analysis and upgrading of quality, checking of design reliability, and other properties)  
(2) Safety and immunity from product liability  
(3) Process design, process and analysis, and process control and improvement  
(4) Process capability  
(5) Instrumentation, gauging, testing, and inspecting  
(6) Equipment maintenance, and control of subcontracting, purchasing, and services  
(7) Quality assurance system and its audit  
(8) Utilization of statistical methods  
(9) Evaluation and audit of quality  
(10) Actual state of quality assurance |
| 9. RESULTS                 | (1) Measurement of results  
(2) Substantive results in quality, services, delivery time, cost, profits, safety, environment, etc.  
(3) Intangible results  
(4) Measures for overcoming defects |
| 10. PLANNING FOR THE FUTURE| (1) Grasp of the present state of affairs and the concreteness of the plan  
(2) Measures for overcoming defects  
(3) Plans for further advances  
(4) Linkage with the long-term plans |
4. Summary
How to Promote Standardization and Quality Control by Audio Visual

by Kanji KAKINUMA
Executive Director of Japanese Standards Association

I. History and Present Situations of Promotional Activities on Standardization and Quality Control by JSA

Japanese Standards Association was established in 1945 as a private non-profit organization authorized by Ministry of International Trade and Industry for the promulgation of industrial standardization and quality control among industrial circles and the general public as well.

Since its inception, promotional activities have been rapidly expanding. For example, 290 seminars and meeting were held nationwide collecting 29,098 participants last fiscal year. Besides, 4 courses have regularly been extended to participants from foreign countries.

From 1957 through 1963, various seminars by radio and TV were broadcasted widely. These seminars by radio and TV were so successful in enhancing quality consciousness and in accelerating introduction of companywide quality control into companies.

The following table shows these seminars held by radio and TV.
<table>
<thead>
<tr>
<th>No.</th>
<th>Year</th>
<th>Period</th>
<th>Time</th>
<th>Theme</th>
<th>Lecturers</th>
<th>Aid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1957</td>
<td>Jul. 15 – Aug. 30 (Mon. – Fri.)</td>
<td>18:25 – 18:40</td>
<td>New management</td>
<td>Dr. K. Ishikawa, 3 others</td>
<td>Radio</td>
</tr>
<tr>
<td>2</td>
<td>1958</td>
<td>Apr. 7 – Aug. 29 (Mon. – Fri.)</td>
<td>18:20 – 18:40</td>
<td>Production &amp; management</td>
<td>Dr. A. Asaka, 8 others</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1958</td>
<td>Sept. 1 – Dec. 15 (Mon. – Fri.)</td>
<td>19:30 – 19:45</td>
<td>In-house standardization</td>
<td>Dr. E. Imaizumi, 7 others</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1959</td>
<td>Aug. 3 – Oct. 30 (Mon. – Fri.)</td>
<td>19:00 – 19:15</td>
<td>Production and management for beginners</td>
<td>Dr. K. Ishikawa, 8 others</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1960</td>
<td>Apr. 4 – Jul. 1 (Mon. – Fri.)</td>
<td>19:05 – 19:15</td>
<td>Easy production management</td>
<td>Dr. K. Ishikawa, 3 others</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1960</td>
<td>Jul. 4 – Oct. 31 (Mon. – Fri.)</td>
<td>19:05 – 19:15</td>
<td>Introduction of QC</td>
<td>Dr. K. Ishikawa, 4 others</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1961</td>
<td>Apr. 3 – Jul. 31 (Mon. – Fri.)</td>
<td>18:35 – 18:50</td>
<td>Easy QC</td>
<td>Dr. K. Ishikawa, 5 others</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1961</td>
<td>Aug. 7 – Sept. 29 (Mon. – Fri.)</td>
<td>18:35 – 18:50</td>
<td>Easy process management</td>
<td>Mr. R. Muramatsu, 2 others</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1961</td>
<td>Oct. 2 – Dec. 22 (Mon. – Fri.)</td>
<td>18:35 – 18:50</td>
<td>How to promote QA</td>
<td>Dr. K. Ishikawa, 7 others</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1962</td>
<td>Jan. 4 – Mar. 30 (Mon. – Fri.)</td>
<td>18:35 – 18:50</td>
<td>How to use statistical method</td>
<td>Mr. H. Karatsu, 7 others</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1962</td>
<td>Apr. 2 – Jun. 29 (Mon. – Fri.)</td>
<td>18:30 – 18:45</td>
<td>In-house training</td>
<td>Mr. J. Ishikawa, 2 others</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1962</td>
<td>Oct. 1 – Dec. 28 (Mon. – Fri.)</td>
<td>18:30 – 18:45</td>
<td>QC for beginners</td>
<td>Dr. K. Ishikawa, Dr. T. Asaka</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1963</td>
<td>Jan., Feb., Mar., (Tue. every week)</td>
<td>21:00 – 21:30</td>
<td>New factories (Standardization)</td>
<td>Mr. M. Ohnishi, 10 others</td>
<td></td>
</tr>
</tbody>
</table>
In 1981, 16 mm movie film named "JIS for You" was made and has widely been used for quick introduction of Japanese Industrial Standards (JIS) and JIS Mark System (Certification System based upon JIS) to oversea countries.

Since 1983, 8 kinds of slides were prepared as follows;

1983: (a) What's Standardization?
1984: (a) Outline of In-house Standardization
       (b) Advancement and Improvement through Quality Control
1985: (a) Practice of In-house Standardization
       (b) Let's Change our Workplace Bright and Pleasant
1987: (a) Better Life — Standardization
       (b) Inspection
1988: (a) Importance of Work Instruction

These slides are also used for participants from foreign countries in seminars organized by JSA for the purpose of letting them easily understand the brief of in-house standardization, QC and QA practised in Japan. These slides are composed of pictures and narration which were carefully examined and arranged by committees consisting of prominent scholars and professionals. They are useful to enhance participants' interest in study and motivate them to study.

II. (Presentation of Slide "Let's Change our Workplace Bright and Pleasant)
III. Some Comments on Promotional Activities by AV based upon the Experience of JSA

Merits of AV education could be described as follows;

(1) To raise interest in studying and motivate trainees to study by
   (a) satisfying curiosity of trainees
   (b) helping concentrate the attention of trainees on studying, etc.

(2) To communicate knowledge, information and techniques by
   (a) materializing concept
   (b) overcoming language difference, etc.

(3) To lessen difference of each member in group training by
   (a) lessening difference of experience of each trainee

(4) To make process of thinking correct by
   (a) providing materials for thinking
   (b) helping formulation of concept

(5) To strengthen and maintain memory

(6) To consolidate study experience

(7) To overcome the boundaries of classrooms by
   (a) helping study very complicated mechanism and phenomena
   (b) helping study microscopic phenomena, mechanism and motion
   (c) overcoming the limits of time and space

Looking back our AV education conducted from 1957 through 1963, the reasons why those seminars were successful to enhance quality consciousness among industrial circles and the general public could be pointed out as follows;

(1) Seminars were conducted in cooperation with NHK (National Broadcasting Corporation) which has nationwide coverage.

(2) The lecturers were selected from among the most prominent scholars and professionals.

(3) The programmes were carefully prepared by committees composed of lecturers and professionals of AV.

(4) Supplemental textbooks to be used along with broadcasting were compiled by the same committees mentioned above and timelily published.

(5) Broadcasting was made in those days when quality movement among industrial circles in Japan was in transitional period from SQC to TQC and demands for knowledge were very high.

(6) Time for broadcasting was set at the most convenient time for listeners and watchers.
- PANEL DISCUSSION -

Roles of Standardization & Quality Control to Contribute
Strengthening Constitution of Enterprise and Benefits Expected

Leader

Mr. Yozo MUKAWA  Professor of Science & Engineering
Department of Chuo University

Panelists

Mr. Zenzaburo KATAYAMA  General Manager of TQC Promotion
Department of Toyota Motor Corporation

Mr. Masaru SEKIGUCHI  Director of Eiko Development Co., Ltd.
(Past General Manager of Quality Control
Division of the Furukawa Electric Co., Ltd.)

Ms. Kanya SINSAKUL  Director of Standards Division of
Thai Industrial Standards Institute

Dr. Pakorn ADULBHAN  Director of Federation of Thai Industry

Mr. Cheovet YIMSIRIKUL  Factory Manager of
Siam Tin Co., Ltd.