THE STUDY ON THE PROMOTION OF TOTAL QUALITY CONTROL IN SMALL AND MEDIUM SCALE INDUSTRIES AND CERTIFICATION SYSTEM FOR INDUSTRIAL EXPORT PRODUCTS IN THE ARGENTINE REPUBLIC

(SUMMARY)

NOVEMBER 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

No.

THE STUDY
ON
THE PROMOTION OF TOTAL QUALITY CONTROL
IN
SMALL AND MEDIUM SCALE INDUSTRIES
AND CERTIFICATION SYSTEM
FOR
INDUSTRIAL EXPORT PRODUCTS IN THE ARGENTINE REPUBLIC

(SUMMARY)

NOVEMBER 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

M P I
J R
90－173

C O N T E N T S

PREFACE

1. Background of the Study

(1) In January, 1988, the Government of the Republic of Argentine made a formal request to the Government of Japan for the execution of the study on the basis of a technical cooperation program between the two countries concerned. The study concerns the promotion of total quality control in small and medium scale industries and certification system for industrial export products. The study shall be executed after the preparatory study conducted in December, 1988 and the preliminary study effected in march 1989.

(2) The purpose of the study is to formulate and establish programs for the introduction of a certification system for industrial products required for the expansion of the exportation by the Republic of Argentine as well as to formulate, taking Japanese example into account, programs for the promotion of total quality control (TQC)* with the objective of upgrading the quality of the products manufactured by the small and medium companies that account for the majority of industry in the Republic of Argentine. It has been agreed between both countries concerned, i.e., Japan and Argentina, that the auto-parts sector should be selected for the study to examine the possibility of developing TQC system suited to the unique requirement of Argentine industry.

* Quality control is based on the concept which has been successful in Japanese industries. The "Quality Management" as defined in the ISO 9000 series is almost the same as this concept.

2. Objectives of the Study

(1) The chief objective of this study is to impart to the Argentine auto-parts industry competitive strength such that it will, on the one hand, enhance and upgrade the quality control procedures of its products and thereby meet the requirement of the consumer and, on the other hand, reach an export capability on the international markets.

For this purpose, this project is carried out to identify the problems concerned with quality control in the auto-parts industries in the Republic of Argentine and, after the clear recognition of the problems, try to formulate suitable methods or procedures for solving these problems so as to draw up the appropriate implementation programs.

(2) The second objective of this project is to aim at the improvement of the quality of industrial products through the establishment of a certification system and to give recommendations concerning the system and diffusion or promotion activities that can contribute to and facilitate the creation, by Argentina's industry, of products that are fully competitive in the export market. To this end, an implementation plan shall be drawn up in the light of a clear identification of the current status of the national certification system in Argentina and upon consideration of some relevant examples of such a system in Japan.

3. Preparation of the Final Report

The final report is the result of the first and second field studies and of data obtained from the domestic and field studies, the interviews made during the visit and the photographic material taken during that time. These various data were carefully studied to obtain a clear idea and to make a thorough analysis of the present level of the auto parts industry in Argentina and the current status of implementation of certification system so as to identify the problems. This then leads to the formulation of possible methods to resolve the recognized problems by having regard to the quality control practices and certification system in Japan.

The questionnaire for the first field survey had been drawn up in Spanish and upon an arrival of the study team in Argentina, a first discussion meeting was held with the Argentine counterpart to check the details. After this, the questionnaires were distributed for completion to the organizations and companies concerned. Questionnaires were addressed to approximately 400 members of the Argentine auto-parts industry, and 113 properly completed questionnaires were returned for evaluation by the study team. This active cooperation was most encouraging as the proportion of valid returns was better than 25%. The final report owes much to the information so willingly provided by the Argentine respondents whose answers were carefully examined and considered for analysis.

For the interviews conducted in the course of the field survey in Argentina, the study team visited and studied government and local administration, workers' unions, some 20 factories of manufacturers in the mechanical auto-parts sector and some 20 factories again of manufacturer in the electro-mechanical auto-parts industry, as well as research institutions, laboratories, universities, and private-sector firms. In addition, visits were organized to Argentina's three top car

assemblers, Japanese joint ventures, and to factories of companies in allied fields. For the visits to the factories of auto-parts manufacturers and to the premises of the inspection agencies and organizations related to certification in Argentina, in particular, use was made of detailed checklists for the observation procedures and of interview sheets. By this means, it was possible to analyze the data thus obtained more effectively afterwards.

Moreover, in the second field study, seven automotive parts manufacturing companies were selected, on the basis of the interim analysis results, for a second study to conduct diagnostic studies of the factory operation process. In addition to factory diagnostics of the automotive parts manufacturing companies, a supplementary study was carried out on the companies related to export, on the organizations concerned, and on the mold/die and machine tool industries.

In the second field study on the certification system, the main interest was concentrated on investigations of the actual situation of the IRAM*-certified factor es. When quality control improvement programs in the automotive parts manufacturing industry were proposed, the study team had to carry out two times factory diagnosis studies, and any measures or plans for the upgrading of quality control in the factories of this industry were formulated on the basis of the diagnostic results. The explanations are here presented from analogous Japanese examples or precedents to add a dimension of practical reality to the problem-solving methods described herein. Programs have also been established for quality control and technical exchange activities in the area of quality control, including the presence of specialists from abroad.

* Institute Argentino de Racionalizacion de Materiales

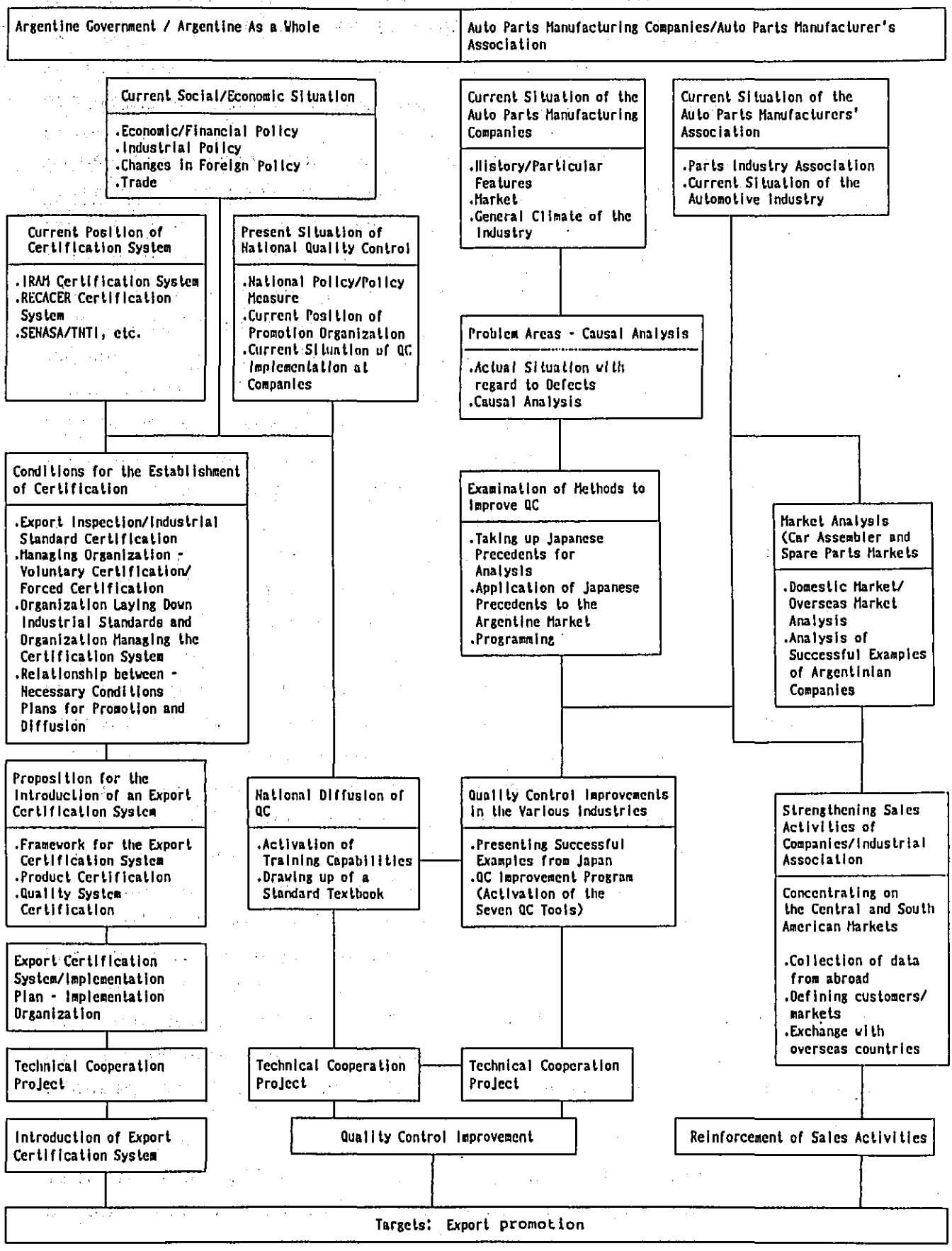
In the process of formulating the plans for the establishment of certification system and diffusion program of quality control, the existing certification system and quality control promotion institutions in Argentina have been studied for closer analysis, and realistic plans have been drawn up, partly by giving consideration to Japanese examples or precedents. Plans have also been drawn up for the establishment of an certification system through technical cooperation made available from abroad.

4. Outline of the Final Report

This final report shall be deemed a summary combining the study results during the second field survey with that involved in the interim report presented in March 1990. The Final Report is comprised of three parts. Part 1 thereof examines the national conditions in Argentina by highlighting only those important areas that are relevant to this study with particular reference to the economic situation, financial policies, finance, social conditions, industry and trade. The second part is devoted to the auto-parts manufacturing industry that has been selected as the specific target sector for the implementation of quality control and the automotive industry as the contiguous domain. This chapter thus deals with the current state of product quality control in the auto parts industry and highlights the particular problems and the causal factors to account for these problems. To facilitate a proper understanding by the Argentine parties concerned of the problems, the report also demonstrates those of the quality control features that are characteristic of the Japanese QC system. At the end, measures to solve encountered problems are suggested and practical projects are introduced.

The third of this Final Report sums up the current status of certification system in Argentina, the present state of the diffusion and promotion activities for quality control and their problem areas, and the certification system in Japan, and proposals for providing a certification system. This following page gives the scenario for the report.

Report Scenario



CHAPTER 1 - PROPOSAL FOR THE PROMOTION OF TOTAL QUALITY CONTROL IN THE AUTO PARTS INDUSTRY

1.1 Need for Quality Control in Automotive Parts Industry

The production activities of the Argentine automobile manufacturers are essentially geared to meeting domestic demand. Under the squeeze of the economic recession in recent years, the volume of output has dwindled to a third of its one-time peak. So heavy has the toll of this recession been, that it has given rise to serious management problems. This difficulties entail the vicious circle of high costs due to falling production output leading to reduced competitiveness of Argentina's exports which, in turn, makes the country's parts manufacturers more dependent on domestic demand and thus renders them vulnerable to production cutbacks. As a result, the necessary investments to upgrade production efficiency and productivity and to improve production plant are squeezed and defective products have to be sorted out manually, with non-standard parts being diverted to the spare parts market. This is indicative of a general mood of lacking interest in making improvements on quality, cost, and delivery. To get out of this hopeless position, it is essential to increase production output by promoting exports. To achieve this and draw even with the auto parts industry on a worldwide level, however, it is critically important for the Argentine auto parts industry to be internationally competitive on quality and cost. The promotion of quality control and efforts made to this end will thus be most effective and vital in ensuring that the level of quality of the Argentine auto parts industry will improve and will be placed on firm ground. If quality control is established, the results will permit improvements in productivity, cost reduction, and regular operation to maintain scheduled production levels and adhere to planned delivery times.

While the introduction and promotion of quality control will not require any major investments, but it will necessitate a

sustained efforts for at least a number of years until some visible effects are achievable and quality control reaches a satisfactory level. The present situation, marked by stagnating production and an unused surplus of human resources, is a very good time to start promoting quality control. These efforts should not be confined to the internal promotion of quality control within companies but span much wider to a quality commitment with an inter-company endeavor. It should include the dissemination and activation of quality control through industry, academia, and the public or government sector. It should also aim at establishing an official quality certification system or an approval system. On the basis of these endeavors, attempts should then be made to promote industrial standardizations in Argentinia. These efforts will have a great contributory effect on promoting quality and quality control within companies.

1.2 Analysis of Present Conditions of QC Activities in Auto Parts Industry in Argentina

1.2.1 Background of the Study

The Argentine auto parts industry spans four auto parts associations and is comprised of roughly 800 parts-manufacturing companies. In connection with the establishment of measures to resolve the existing quality control problems, it is difficult to view the industry in sweeping general terms covering all of these 800 companies or so. This leads to the danger of describing the industry without the necessary specificity to make sense. For this reason, it is essential to narrow down the target areas to some extent and to define "clusters" for which certain solutions to existing problems are indicated. Specific statements must then be formulated with these "target clusters" or groups clearly in mind.

In the process of arriving at such a more narrowly defined target, we carried out, in August, 1989, a questionnaire study covering 400 of the above 800 firms in the industry. The

questionnaire study elicited a 28% response, and the results of the questionnaire answered by 113 companies were analyzed. The questionnaire responses gave a good idea about the general situation of the Argentine auto parts manufacturing industry and its current status or level of quality control.

The next step was to conduct a site study by visiting 40 companies manufacturing auto parts and assessing the factories. This study was implemented from August through September, 1989. The checklist completed on factory inspection as explained in Chapter 2 of the draft final report, forms the basis on which the forty companies visited were assessed by using identical criteria.

Again, in March, 1990, a further study was conducted to assess product quality at seven of the 40 firms that had been visited. This quality diagnosis study was based on the analysis results obtained from the above questionnaire study and from the plant inspection assessment performed on the said forty companies.

1.2.2 Results of Survey for Auto Parts Industries

Interview survey as well as inspection of factories were carried out depending on the check list for factory inspection by visiting 40 auto parts manufacturers.

Of the check items described in this check list, 26 items closely related to quality control were selected, and the survey was carried out in relation to the selected items. The ratio of companies valued as "acceptable" for each item against the total companies visited during the survey (40 companies) is as shown in Table 1. The results show that the basic rules for quality control are not observed in the following senses.

(1) The measures taken when defective items are generated in a production process are not correct.

1) The defective items enter the next production process. (Item 15)

A defective item should be removed in the process where it is generated. If the defective item is processed in the subsequent processes, the processing cost is completely of no use, which also gives bad effects to delivery.

2) The inspection functions only for screening defective items. (Item 21)

In inspection, especially in process inspection, necessary measure should be taken for removal of defective items. At the same time, it is necessary to collect information required for finding and removing the cause. This kind of considerations should be taken into mind, especially in inspection made immediately after the production step is replaced with a new one.

3) Generation of a defective item is not reported immediately to the supervisior. (Item 20)

4) Information concerning on defective items is not fed back. (Item 24)

It is important to feed back information concerning any defective item via the supervisor to the related production department(s), or the procurement department, if necessary, for finding and removing the cause. Unless this measure is not taken, the defective items are produced continuously.

5) Situation of generation of defective items are not informed to related people clearly. (Item 25)

Quality control is started by each worker controlling his or her own works. For each worker to accurately understand the situation concerning his or her works, it is indispensable that the general situation of generation of defective items is clearly shown to all of related people. If possible, a control chart which enables related people to recognize the situation during progress of the production process should be shown to all related people to prevent any defective items from being generated.

(2) Any device for prevention of easy mistake or for improvement of job efficiency is not available. (Item 22)

These tools and facilities are very useful not only for improvement of job efficiency, but also for maintenance of the product quality level.

(3) Half-finished items (defective items) are left at job shops. (Item 9)

Responses to the item 12 indicate that half-finished items and defective items are separated from good items in most factories (65%), but it is not desirable for them to be left at job shops. If left, it may cause mixing of different parts with a similar form or processing miss. To prevent defective items from being mixed with good items, it is necessary to put a clear display on the defective items and store them at the specified site.

(4) A work process flow chart is not prepared. (Item 10)

Before start of production, it is necessary to fix the necessary works and their sequence for satisfying the required product quality and to prepare a process table. Various types of control, such as process control and quality control, can be planned and carried out according

to this table. Without preparing this process table (the flow chart is its core), it is extremely difficult to correctly control any production process.

(5) People responsible for quality control do not interchange with people in each section. (Item 18)

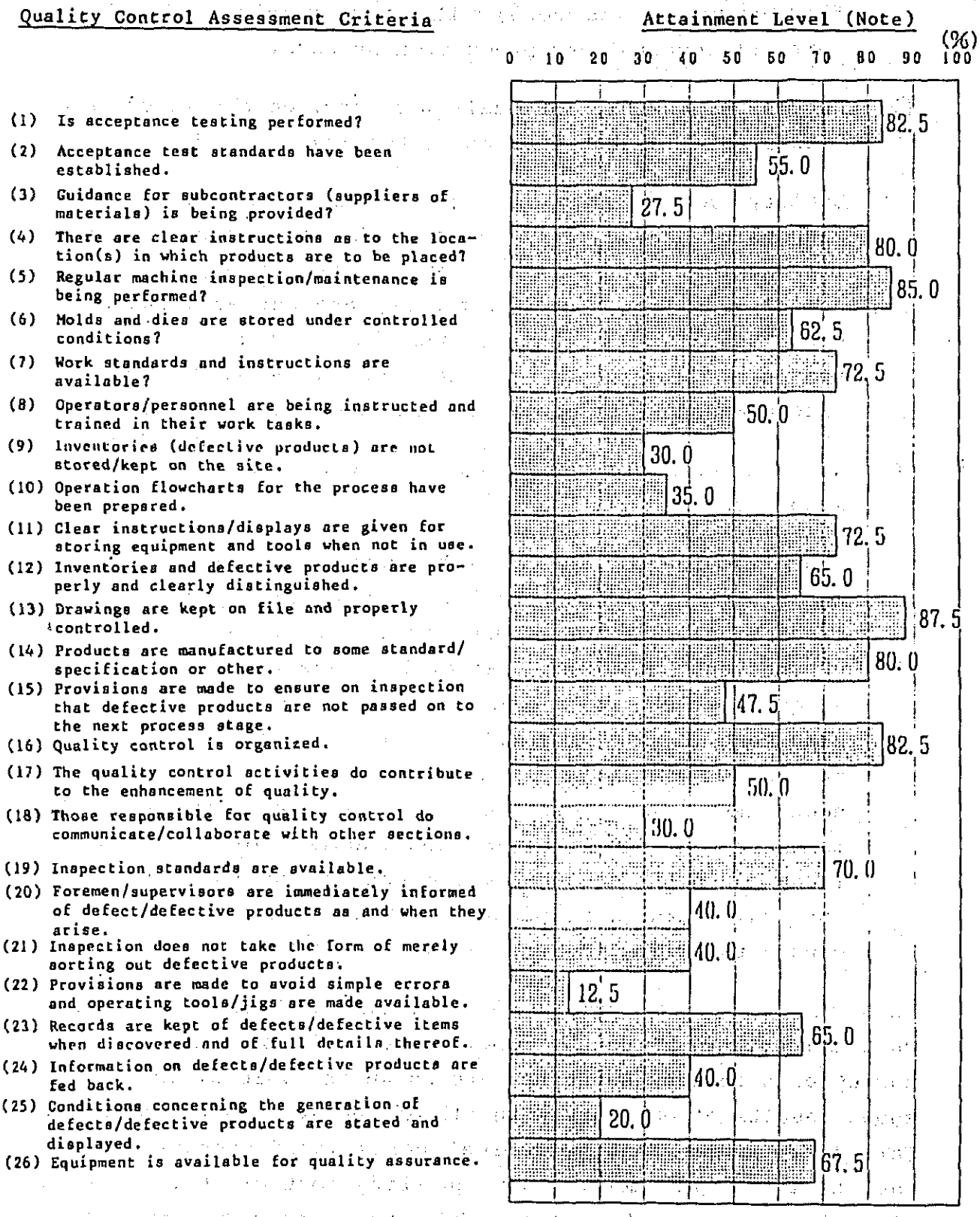
Quality control can not be performed by only people responsible for quality control. They play a central role in maintenance and promotion of quality control activities throughout the factory and act as manages who supervise quality control activities there. For this reason, they can not perform this role without interchanging with people in each related section.

(6) No guidance is provided to contractors (material suppliers).

There are few companies which produce all items including materials (including auxiliary materials required for production), parts, and even final products for themselves. For this reason, it is necessary to make up a quality control plan even for purchase or order placement of raw materials. Even if quality control at the supplier's site is at an excellent level and they need not any guidance by the manufacturer, the manufacturer should inform the supplier of the required items in relation to quality control of their products for promotion of mutual understanding between the manufacturer and the supplier.

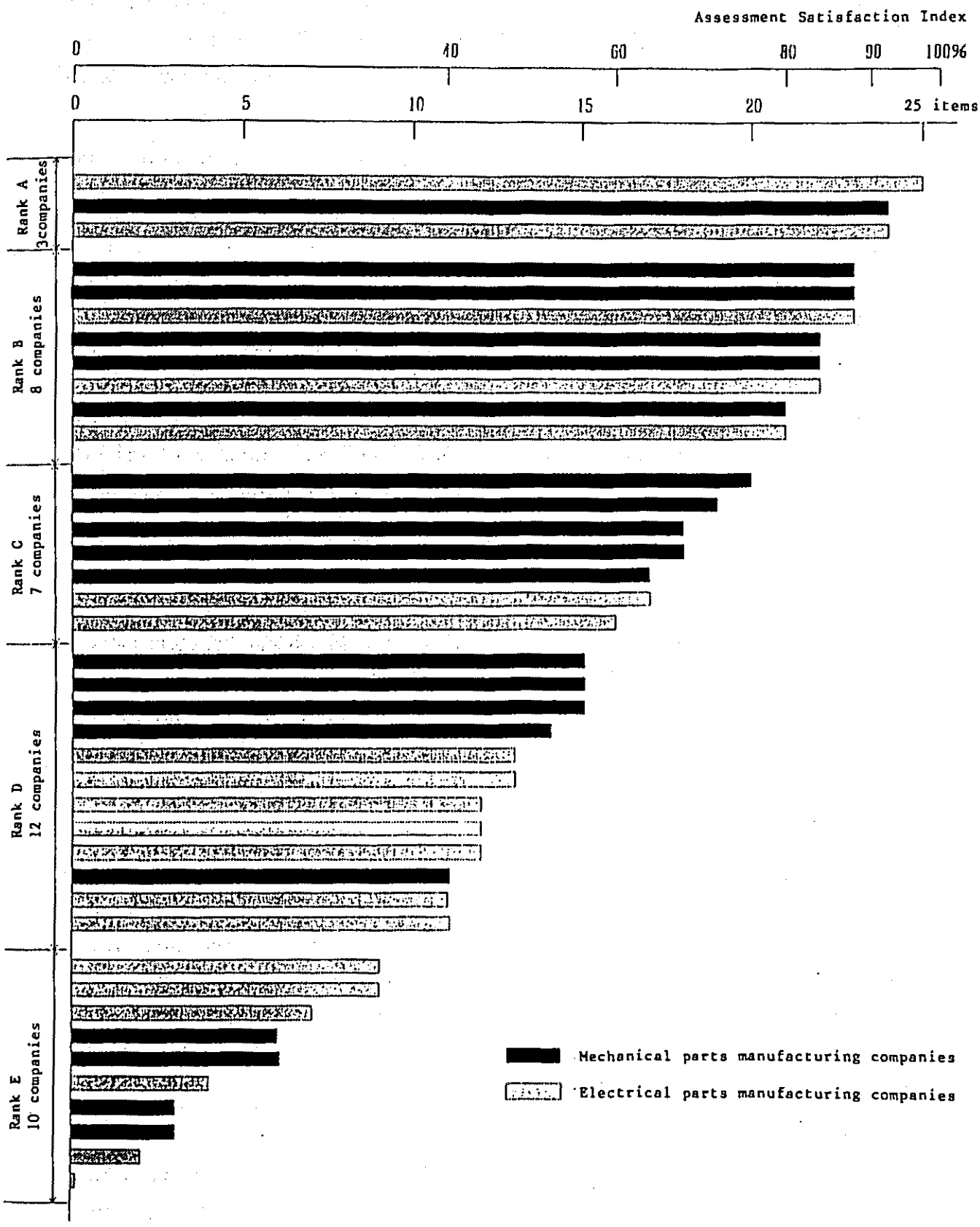
In what items each company was valued as "Acceptable", and what percentage of the 26 items especially selected for our survey each company satisfied are shown in Table 2. This table shows results of our survey in all of the 40 target companies. This table shows that mechanical parts manufacturers satisfy the basic requirements for quality control better than electric parts manufacturers. Note that the total number of items values as "acceptable" in 20 mechanical parts

Table 1 Quality Control Assessment Criteria and Assessment Results



Note: Attainment level = ratio of the number of companies given a "good" mark on assessment to the total number of companies visited for inspection (i.e., 40).

Table 2 Assessment Results by Company Visited for Inspection



manufacturers was 315 while that in 20 electric parts manufacturers was 263. Assuming that the satisfaction percentage of 90% or more is rank A, 80 to 90% rank B, 60 to 80% rank C, and 40 to 60% rank D and less than 40% rank E, the number of companies ranked as A of the 40 target companies for this survey is 3, rank B 8, rank C 7, rank D 12, and rank E 10 companies.

It can be guessed that companies belonging to each rank are regarded respectively as follows.

Rank A

In terms of quality control, the companies falling within this ranking compare with the average level of western (European and American) and Japanese companies of identical scale. The companies themselves show an export drive and some of the companies concerned have already established a record of exports to the western markets. There was one more mechanical parts manufacturing company corresponding to rank A, although this was not included in the companies visited.

Rank B

The companies with a B ranking do engage in quality control activities themselves but to reach a satisfactory level it is felt one further step is needed. Efforts are made to export and some of the companies also export to the Central and South American markets. The companies corresponding to this ranking accounted for some twenty percent of all firms visited.

Rank C

The companies with a C ranking are felt to have considerable room for further efforts being made in their quality control activities. Most of the customers of these firms are domestic car assemblers. Although these companies have an interest in exporting, they do not make an effort to export. The companies corresponding to this ranking accounted for some twenty percent of all firms visited.

Rank D

The quality control activities of the firms with a D ranking

are not adequate, with defects/defective products occurring in every stages of the manufacturing process in their factories. It is thus considered vital for these firms to take very early steps to deal with such defects. Customers consist of domestic car assemblers and the spare parts market. The final products are sorted and the satisfactory products are supplied to car assemblers, and the unsatisfactory products to the spare parts market. While these companies have an interest in exporting, they have no forward-looking commitment in this direction. The companies corresponding to this ranking accounted for some thirty percent of all firms visited.

Rank E

The companies ranked E are considered as having virtually no quality control activities. It is therefore vital that management of these companies should have an awareness of the need for quality and quality control. Practically all of their production is supplied to the domestic spare parts market. There are also some firms trading with car assemblers, but there is a higher proportion of companies supplying the spare markets.

Details about area of improvements in quality control, a topic to be discussed in the next and following sections, will be presented by concentrating on the groups of companies ranked C and D. The primary objective of presenting the companies ranked C and D is to aim at advancing these companies to rank A and B.

When progress in the dissemination of quality control has succeeded in making the groups of companies ranked as A or B much more substantial, it will be possible as a result of expect that a volume of exports to the Central and South American markets. The groups of companies ranked as C and D among those visited for observation accounted for half (20 companies) of the total companies visited. Efforts to strengthen these companies and raise their quality standards so that they would qualify for a higher ranking would therefore have the most beneficial effect on the Argentina's auto parts industry as a whole.

Figure 1 shows the distribution pattern for the number of companies visited in relation to their "Assessment Satisfaction Index." It can be realized from this figure that the Argentina's auto parts manufacturing companies are almost equally distributed between those having a good quality control organization and those practically devoid of quality control activities. If the companies with an "assessment satisfaction index" of 40 - 80%, a level given as the target in this chapter come up to an "assessment satisfaction index" of over 80%, it will mean that the distribution chart will have a concentration in the A and B ranks, resulting in a sharply rising curve ascending to the 100% apex for the cumulative percentage rate of companies.

The areas of quality control discussed on the next page highlight the groups of C and D ranks. For the enterprises ranked A, B and E, the following effects are expected.

1) Effects for companies ranked A and B

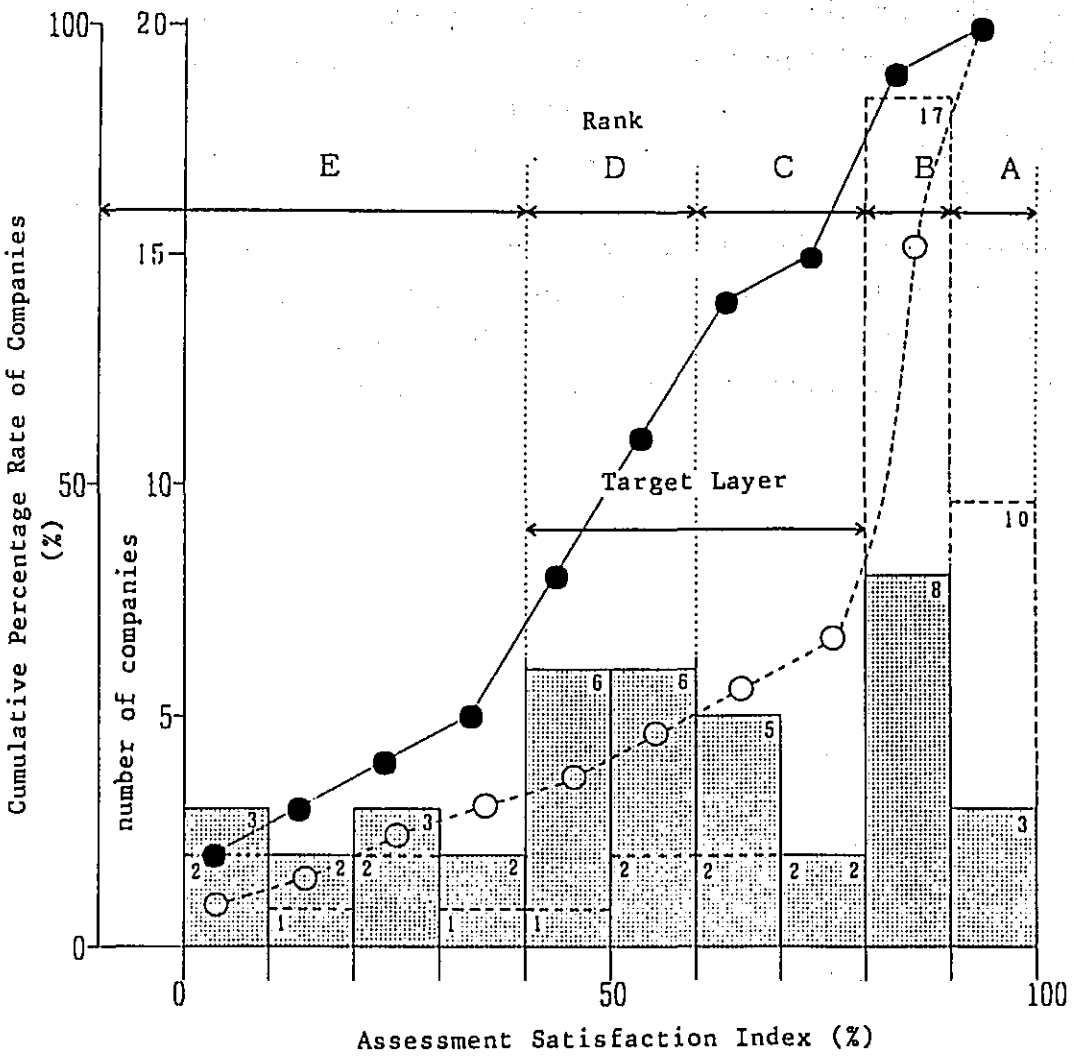
The companies conduct quality control through their own auxiliary capabilities. They are able to utilize the problem-solving methods laid down in this report as self-diagnostic materials. Practical examples that can serve as reference for quality control activities should be incorporated in their in-house quality control systems. The targets to be achieved as stated in 1.3.6 are effective immediately as of now for performing a diagnosis of the current status of in-house quality control activities.

2) Effects for companies ranked E

While it may be difficult for these companies to implement the problem-solving methods described here of their own accord, they should gradually take up the problem-solving measures they can execute as targets for the near future. It is essential that these areas should be designated as corporate targets.

Finally, based on the works diagnosis results for the forty companies we visited on this occasion, we have specified improvement areas for quality control applicable to the companies ranked C and D. Given the 600 companies belonging to the automotive parts manufacturing industry of Argentina, it is felt important that this report should be used to implement self-diagnosis based on the previously stated quality control evaluation criteria so that the companies themselves become aware of their ranking in the priority order for quality control procedures. Based on such an awareness, it is recommended that these companies should then upgrade the quality control by selecting which problem-solving methods they feel they should adopt and which they feel should be discarded or use such material for reference.

Fig. 1 Distribution of Assessment Satisfaction Index for Quality Control



: Actual status at the 40 companies visited

: Distribution chart for companies after improvement of quality control

1.3 Steps to Introduce TQC and Areas of Application in the Auto Parts Manufacturing Industry

1.3.1 Introduction

To achieve effect quality control, it is essential to enlist the participation and active cooperation of all employees of the company and at all stages. This must include the managers of the company, the supervisors, foremen, and operators and cover all areas such as market research, research and development, product planning, design, production setup, purchasing, placing of orders with subcontractors, manufacture, sale, and after-sale. Quality control carried out in this manner is here referred to as TQC or Total quality control. This concept comes close to the term "quality management" as employed in ISO 8402 (Quality - Vocabulary management and Quality assurance standards - Guidelines for selection and use).

The normal sequence of steps for promoting TQC within the company as a whole runs from Management policies through training and education, assignment of responsibility within the organizational structure, clear demarcation of powers, plans for the promotion of TQC, clear indication of problem areas, analysis of process and process stages, standardization, process control, dealing with complaints, to quality diagnosis. When all of these steps have been completed, the sequence returns to the management policy step so that the whole sequence can be repeated. If quality control is introduced as something entirely new, however, there is not sufficient confidence or conviction about the need for quality control and for its effectiveness and validity. There will thus be very substantial opposition to the introduction of quality control at all tiers of the corporate organization and in all of its divisions and departments.

The previous section referred to those of the Argentina's companies in the auto parts manufacturing industry that were

given a C and D ranking in terms of their quality control and it was suggested that these should take up total quality control (TQC). We shall here describe in some fuller detail the first basic steps required in this direction. We have therefore concentrated on the purchasing, subcontracting, manufacturing, and inspection stages. If quality control can be firmly established in these stages and if it can be made to work effectively, the importance and validity of quality control will also be realized in the pre-production (product design) and post-production (after sales service) stages. When that time has come, it will be important to introduce quality control also in these stages. Once the implementation of quality control has been seen to be successful, the difficulties of trying to inculcate a TQC-mindedness and of applying TQC as a "tool" in the quality-related activities of all sections and divisions, including personnel and training will diminish.

1.3.2 Total Company Awareness toward Quality Control (The 1st Step)

To introduce and promote quality control, it is recommended to the Argentina's auto parts manufacturing industry to develop, as the first step, an awareness of the need for quality control and to have a willingness to implement quality control. This awareness and willingness is not simply an attitude prevailing at the top tier of company management. Quality control-mindedness is not a conviction limited to one person in the company, rather it must have a broad basis of support stretching to all divisions and all departments involved with the technical process, notably the manufacturing and inspection departments. The quality control endeavor must also be joined by those areas which are not directly concerned with technical production such as the financial administration, accounts, personnel, and staff training departments. Thus the recognition of the need for quality control and the willingness to introduce it must be shared by all section of the corporate organization and

"cascade" down from top management through the higher and medium echelons of corporate management to the foremen and operator on the shop floor. This means that it is not enough to issue one or two notices and instructions and let it rest at that. Rather, it is essential to call and hold meetings in all areas and at all levels of the corporate organization to draw up a quality control charter through the common consensus reached as a result of discussion. If this first step is not adequate, the implementation of quality control will "drag on" and a disbelief about quality control will again arise so that the introduction of quality control may even be made impossible.

Though the reasons considered necessary for promoting quality control may differ from one company to another, it may be convenient to sum them up by referring to the following facts.

(1) Nature of the auto parts manufacturing industry

(2) Current status of quality control at the Argentina's auto parts manufacturing companies

(3) Moves to upgrade and diversify quality control in response to quality requirements for auto parts in the connection with technical progress in general

(4) Improving the corporate organization so as to ensure quality and price standards to stand up to domestic and international competition

(5) Establishing a fully comprehensive control system integrating Q (quality), C (cost), and D (delivery).

The introduction of quality control also involves the use of some ancillary means to supplement the perceived need for quality control and the willingness to see it put into practice. These ancillary means may include:

(1) Presentation of some practical examples demonstrating the effectiveness of quality control and the benefits achieved through it

(2) Visiting companies that have benefitted from the introduction of quality control.
This "teaching by example" would be even more instructive if foreign companies in the same sector of industry were visited.

(3) Letting experts who are proven and recognized authorities in the quality control domain talk about the necessity of quality control

(4) Insisting that suppliers and vendors should implement quality control.

1.3.3 Recognition of Inadequacies by the Total Company Staff (The 2nd Step)

The course of action given as the second step is for the entire company personnel to develop a completely shared awareness and interest with respect to the identification and resolution of weak areas that need to be improved. If it is a company with a very advanced level of TQC, the second step will be to take shape of an "fiscal year plan for the promotion of TQC," and not just a "resolution to overcome areas of weakness." This report proposal document aimed at companies ranked C and D in terms of their current status of quality control recommends that in the process of resolving inadequacies and especially in the initial phases of introducing quality control, particular attention should be given to the "generation of defects." It is self-evident that the company's efforts to deal with these inadequacies cannot and must not at merely concentrating on product defects. It should rather address itself to a comprehensive range of problem areas such as inadequacies in the equipment and layout of the production site within the factory, problems over inventories and warehousing as well as slow production. In the initial phase, the number of inadequacies or problem areas should be reduced to a manageable few. For this purpose, a certain number of problem areas may be selected out so that

they can serve as practical examples of problem-solving to and within all section of the company.

Also in this step, it is essential that the company's top management leaders should state concrete achievement goals and disclose actual levels of achievement. The manager of the next lower departmental tier under top management must then formulate and determine the policies and targets of quality control to be achieved within the corporate domain for which he is responsible. These policies and targets must then be fed down the line and explicitly stated to the tiers below. In this manner, the policies and targets laid down at the top are fed down the entire hierarchical structure from the top echelons through the department and sections to the shopfloor. In this process of handing them down, these policies and goals are effectively translated and "broken down" into concrete, tangible instructions for action and targets to be achieved. This breakdown process requires sufficient adjustments and coordination cutting vertically and horizontally across the entire corporate hierarchy. As a result, the problem areas pointed out at the top are perceived as problem areas and recognized by the entire company personnel so that it forms a single vector for the entire workplace, the whole of the company.

The managers at each departmental tier must do more than mere announce policies and targets. They must establish documents that clearly define and assign the necessary responsibilities and limit the authority for the implementation of quality control. They must also see to it that the organizational basis is laid for the necessary training and education. They must also keep a close check on the situation by demanding to have regular reports served to them from the departmental tiers below them, with clear indications as to whether the goals are attainable within the predefined time limits or not. It is the responsibility of these managers to devise the necessary measures to ensure goal attainment. The education and training provided at each implementation level for those

involved with quality control should include at least the items specified in Table 3.

Table 3 Subjects for Quality Control Training

Subjects	Tier			
	Managers	Core Control Personnel	First-Line Control/ Supervision Personnel	Operators
Basics of TQC	o	o		
Management and Quality Control	o	o		
Principles of Quality Control (PDCA)		o	o	
Implementation of Quality Control		o	o	
Standardization		o	o	
Method for Resolving Problems			o	o

Those of the Argentina's auto parts manufacturing companies which supply their products to car assemblers appear to have a managerial and technical quality control staff familiar with the theory of SQC. The problem, however, is that they do not have a strong commitment to put SQC theory into practice. Auto parts manufacturing companies have to study the applied technology required to put the theory of SQC into practical use at the shopfloor level. Many of these companies have no approval from car manufacturers and sell their parts on the spare parts market so that these do not even know or comprehend the concept of SQC theory. Under these conditions, it is of the greatest importance for auto parts manufacturers in Argentina to accept and the relevance of statistical quality control (SQC) procedures and effectively apply them in the own plant operation. This is one of the major issues for Argentina's auto parts manufacturers. The practical

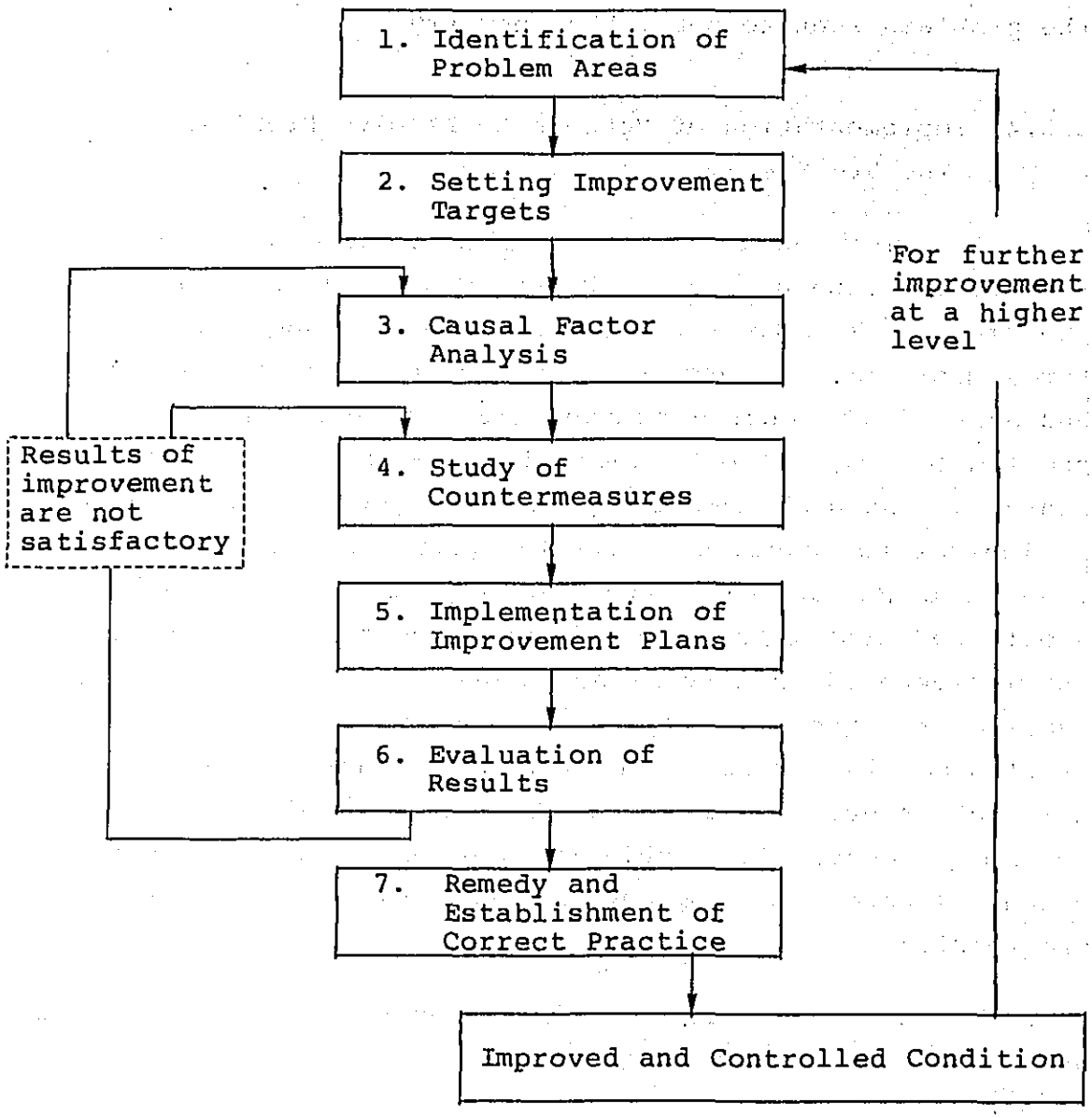
application of statistical quality control procedures is considered to be a means of resolving many, if not most, of the problems seen to beset the industry.

1.3.4 Implementation of Methods to Resolve Problems (The 3rd Step)

The third step is the implementation of measures to resolve existing problems. First, the problems to be resolved are brought down to a manageable number - say, one or two or three problems -, and as part of this step, the overall endeavor of the entire company staff is enlisted to make the problem-solving effort succeed. When success has been achieved, the problem-solving endeavor goes further. Since it is logical to assume that similar problems are bound to occur also in other or other types of products, the problem areas should be identified there and measures to resolve them taken and implemented in like manner. Once it has been possible to resolve similar or identical problems in many areas the problem-solving process can then be extended by selecting the next set of problems areas identified as requiring a solution. In this manner, the problem-solving endeavor may constantly extend within the company at the rate of an arithmetic progression.

Fig. 2 shows the basic layout for problem-solving, and the problem-solving endeavor will be explained in fuller detail below.

Fig. 2 Procedures for Resolving Problems



(1) Identification of Problem Areas

(a) Select the specific characteristics of the problems. While taking into consideration the items described below, select the characteristics that are appropriate for the implementation of attainment goals in accordance with the policies laid down in 1.3.2.

- Take up characteristics that are related to the process and classify them in accordance with their relative importance.
- Select the characteristics in respect of which there are many complaints from buyers/customers and from the next-processing or finishing stages.
- Select characteristics in respect of which there are many problems in terms of high reject/defect rate and considerable deviation/dispersion.
- Select characteristic problem areas in the earliest possible process stages, given the present practice of Argentina's companies letting defective products pass further downstream to the next processing stages.
- Consideration may also be given to problems associated with costs, delivery, and safety and not only problems directly related to the quality aspects of production.

(b) Collect data to obtain a clear picture of the actual situation. As shown below, it is best to examine the actual situation by gathering data and evaluating them through statistical procedures on the basis of a breakdown by stratification, although other methods, such as intuition, experience, or testing are available.

- Express the defect and complaints data in a pareto chart to determine the most important problems.
- Prepare graphs and control chart to examine the extent of variation on a time basis.
- Prepare histograms and process capacity charts to assess the current process capacity status.

(2) Setting Improvement Targets

Confirm the characteristics values selected as the index values for resolving the problems, and determine the sampling method for these data, the measurements methods and if necessary, the boundary sample.

If possible, also state the target values to be obtained after the improvement has been achieved. Determine the ultimate time limit for resolving the problems and the time limits for each process until the final stage of improvement has been reached.

Draw up implementation plans (P) involving the setting of targets and time limits, implement them (D), check them in the course of implementation when each measure is acted upon (C), and, if necessary, take the necessary countermeasures (A). This way of proceeding is the normal manner of advancing quality control.

(3) Causal Factor Analysis

(a) Identify the factors that are related to the selected characteristic values first. For this purpose, technical knowledge and experience is essential to draw up cause and effect diagram using the factors influencing to the characteristic values. It is then also essential to examine the shopfloor/site very carefully to identify those operations that are subject to considerable dispersion. Use these data for complementating and correcting the cause and effect diagram.

Collect data covering the main factors concerned and draw up histograms or graphs from them so as to examine the variations in time and, where appropriate, compare with target values or limits determined in the operating standards.

(b) Study the relationship between the characteristic values and the factors next. Draw up graphs, histograms, control charts, scatter diagrams or similar diagrams from the characteristic values broken down with respect to each of the factors selected in (a) above. (Let us use an example to make it clear: If the operator has been identified as the major factor, break down in terms of operator A, operator B, operator C and so on.) If the existing data cannot be broken down into stratification by each factor (that is, if the characteristic value and the factor do not match), new data must be gathered until this "match" is obtained. For this purpose, it may be necessary, in some cases, to rearrange or alter the process conditions deliberately to gather data.

(c) If it should not have been possible to identify the relationship between the characteristics values and the factor with adequate clarity, start gathering new data. In other words, run experiments.

Before conducting experiments, determine the characteristics to be covered by the experiments. If it is felt, however, that there are also other characteristics that may be affected by the factors, be sure to also include these characteristics in the experiments. Moreover, determine the factor covered by the experiment and the appropriate level (for example, take three levels corresponding to operators A, B, and C).

Conduct the experiments on the basis of an assignment program defined in the experiment plan. Analyze the results obtained to assess the relationship between the characteristic value and the factor.

(4) Study of Countermeasures

After re-confirming the improvement targets specified in (2), examine the improvement measures for the factors capable of being handled on the basis of the analysis results, that is, the factors for which the countermeasures can be executed. In this context, it is essential to consider cost and safety which influence to these factors.

(5) Implementation of Improvement Plans

Prior to the implementation of countermeasures, it is necessary to draw up an implementation plan.

The implementation plan spells out the sequence and procedure for implementation and the division of the responsibilities for implementation. It also specifies in clear detail the manner in which data are taken for assessing and evaluating the countermeasures. For implementation, it is also essential to draw up some provisional standards to produce the jigs/tools with the required improvement or test-manufacture new ones.

Countermeasures are implemented (by way of test) on the basis of this implementation program.

(6) Evaluation of Results

Using the same method as that employed for establishing the nature of the problem as described in (1), (for example: pareto chart using defect or complaints data), express the data, obtained by conducting the countermeasures on a test basis, compare the improvement target values and the pre-improvement values to evaluate the improvement. Conduct the comparison between the pre-and post-improvement values in factory cost terms to obtain results that are easy to make sense of.

When evaluating the results, be sure to also evaluate the impact of these data on other characteristics, on the economics of the process, and its safety.

Publish the results in the in-house company news sheet and organize meetings to announce them in the company. If internal prizes or awards are conferred, it is recommended that notice thereof be published in external announcements and PR meetings.

(7) Remedy and Establishment of Correct Practice

Improvement plans must become part of the daily works practice by ensuring that they are made standard routine. For this to be achieved, the following measures are essential.

1) Lay down or amend standards and drawings related to improvements, notably the operating standards. Argentina's companies appear to be badly provided, in many cases, with standards. When improvement results are thus made standard practice, it may therefore be wise to attempt standardization in due course by standardizing, without any change, all existing areas other than those affected by the improvement action.

2) Carry out training and practice sessions to teach operators how to use the operating methods based on the new standards.

3) Select the appropriate control characteristics and prepare control charts and check sheets for use in normal routine operation.

After standardization, be sure to check the following points.

1) Are operations performed in accordance with the newly specified standards?

2) Are the expected results achieved?

3) Do the new standards not have any negative effect in other areas?

1.3.5 Use of External Organizations to Upgrade Quality Control

In the interests of improving and upgrading quality control in companies, it is naturally of primary importance for the company president to supervise and direct quality control and for the operators to receive training. It is also effective in this context to enlist the cooperation of existing outside organizations concerned with quality control.

(1) Car Assemblers

For the auto parts manufacturing companies, the car assemblers are the organizations closest to them. Some Argentina's car assembles have prepared quality control manuals for parts manufacturers to give the most detailed guidance for suppliers of auto parts in terms of such items as purchased parts, manufacturing process capability, establishment of control charts, and inspection standards. There are also some other car assemble which provide detailed guidance on regular machine maintenance/inspection and calibration methods, amongst other things.

For the auto parts manufacturer, the car assembler is the first-line customer and his primary objective must therefore be to become the car assembler approved and accredited factory. The best and most efficient way to have his factory approved by the car assembler, is thus for the part manufacturer to receive ongoing guidance on quality control and learn quality control procedures and methods.

(2) Organizations and Universities Concerned with Quality Control

There are various institutions concerned with quality control in Argentina. These entities include, above all, IACC, ASADECC, CGI, UIA, INTI, IRAM, UBA, UTN and CTA. In addition to these institutions, there are also special inspection organizations although these do not have regular courses on quality control available.

The above organizations run quality control courses and training courses and provide a range of services. They can be used extensively for "extramural" training purposes by companies.

(3) Specialists from Abroad

While making active use of the guidance provided by the domestic car assemblers and the domestic organizations or institutions concerned with quality control in Argentina, guidance on quality control can also be effectively called upon from overseas experts. This assistance is liable to have a great effect in improving and upgrading quality control in companies.

In Argentina, there is a lack of quality control specialists capable of performing factory diagnoses so that much hope is placed on foreign experts. Absorbing the quality control methods of the advanced industrial nations and acquiring in-house experience with quality control, it is vital for auto parts manufacturers to achieve fast improvements in quality control. At present, factory diagnosis, conducted by overseas quality control experts, is one of the most effective methods of achieving an immediate improvement in quality control.

1.3.6 Final Objectives to be Achieved

If the process from the first step of introducing total quality control (TQC) as stated above to the third step is

properly and conscientiously carried through and the implementation of these steps and the cessation of previous practices is effectively put into practice, it should be possible to arrive at a set of conditions that should permit the final objectives laid down in this section to be achieved within two or three years. In other words, this should enable total quality control to become a reality in the factory in a full and complete sense.

As stated in 1.3.1, the achievement of what we have here described as complete TQC signifies an ongoing improvement and upgrading of the quality control, a process of quality improvement spiralling upwards through the entire hierarchy and extending across the entire breadth of the corporate organization and all other activity levels of the company. This effort is carried through with the participation of management in particular, as well as the foremen/supervisors, operators and the all company employees broadly cooperating in the implementation of quality control activities. It is a process involving a succession of repeated promotion steps proceeding in the direction from management policy -- training/teaching -- organization -- clear assignments of responsibilities and authorization -- TQC promotion plans -- Clarification of problem areas -- Process analysis -- Process improvement -- Standardization -- Quality diagnosis. At every point, the process goes round in a cycle from P (Plan) through D (Do), C (Check) to A (Action).

The following discusses the ultimate objectives that should be reached in more concrete detail. In other words, this is the way TQC should be.

(1) Conditions Prerequisite to TQC

It has already been stated at the beginning of the introductions, that the absolutely essential prerequisite to quality control is "a determined interest in the quality of the company's products." It is on the basis of such a dedicated interest that a quality control

system is developed and as this system is being put into practice, reference should be made to the appropriate international standard, i.e., ISO 9004 (Quality Management and Quality System Elements - Guidelines) which specifies the key elements in this process. It is recommended that every effort be made to translate the details laid down in this standard into practice and apply or transfer them to the company.

If, for example, we have a company manufacturing in accordance with the design drawing supplied by the buyer of the products, the market research element (item 7) and design element (item 8) referred to in ISO 9004 may not apply. In some cases, therefore, it may not be possible or practicable to apply some of the factors, depending on the actual conditions of the company. In the future, when Argentina's auto parts manufacturing industry will have to look for overseas markets, it will be essential for the industry to aim for the achievement of its ultimate objectives through the effective and consistent implementation of all elements laid down in ISO 9004.

The primary reason for recommending ISO 9004 to consult is that this standard corresponds to the total quality control successfully carried out by Japanese companies. The second reason is that for Argentina's future auto parts manufacturing industry which will supply its products to car assemblers outside Argentina or which may participate in the overseas automotive parts market, it will be very advantageous to use worldwide approved standards as the basis for its production. The third reason is this. Should the ISO 9000 series be used in the future for the automotive parts certification system on the overseas markets, the fact that quality control is carried out to meet ISO 9004, a standard of the same series, will facilitate response to this certification system.

(2) Philosophy on "Quality"

The supreme objective of quality control is to produce in accordance with the buyer's requests and the purpose of the products concerned and to economically create high-quality products that will satisfy the expectation of the buyer. Quality in this sense is termed "ultimate product quality." The meaning of this terms implies that this quality must be recognized in the ultimate stage, the usage stage: Ultimate product quality must thus manifest itself when the products passes into the hands of the buyer and when it is being used. Within the manufacturing company, production activities are conducted in practice in a manner not completely consistent with this expression. In other words, the quality level to be generated in order to achieve the ultimate product quality must be expressed, in the drawings and manufacturing specifications, in terms of the characteristics and properties aimed at in connection with the production of the products. This constitutes the "design quality."

Thus, the design quality must be capable of generating without failing the ultimate product quality and at the same time it is essential that this design quality should suit the in-house process capabilities, that is, the capacity to produce quality. In companies engaged in their own product development and design, this is the point of departures at which quality control starts. It is the most important stage. Therefore, design quality is determined and achieved through mobilization of the intelligence and knowhow faculties of all divisions and departments, primarily the design department as well as the sale, production, manufacturing technology, quality control, and cost control departments.

In order to achieve design quality, it is necessary, in the production stage, to determine or decide the qualities, characteristics range of dispersion (tolerance

range) for these properties as they arise in each process or stage of production. This constitutes production quality. The products obtained when one process (stage) is completed, will always exhibit a certain dispersion range in its properties. Defective products (rejects) will occur in continuous succession unless the average values for the properties concerned do not exceed a value determined as the design quality parameter. This shows the significance of the dispersion range (tolerance). Quality control in manufacture is the monitoring and controlling of these average values and dispersions.

When products obtained at the end of a process (stage) are subjected to inspection by random sampling and sent to the next process stage, it is essential that an optimum sampling method be used, that is, a sampling technique optimally capable of determining the dispersion in the properties of the products of the given lot under random sampling inspection. If this sampling method is not optimally suited, it will not be possible to assure the "post-inspection quality" - that is, the quality of the lot when it has been inspected. This is one reason why it is so essential to maintain the dispersion in the property values for a manufacturing process within a certain constant range if random sampling inspection procedures are to be conducted on an ongoing basis. In the same manner, when the buyer has specified the sampling procedures (size of lot, size of sample, number of samples required to pass the inspection), it is essential to control the dispersion of the physical property values for the products in the process so as to assure a given permissible lot defect/reject rate that corresponds to the intentions of the buyers when he specified the sampling procedure.

In Japanese production lines, quality control is executed at each stage in the manufacturing process with the notion that the next process stage is the buyer. The

operators in each process stage make an effort to "hand over" to the next process stage such products as meet the expectations for the next process. This also means that when information about complaints is requested from the next process stage, the real purpose of requiring such data is that these assist in improving the process stage in which the operators are engaged. When notices about quality have been received from those responsible for quality control, the response is not just a passive acceptance of these data.

In Japanese companies, quality is not confined to the quality of products alone. Thus, for examples, quality parameters are used in Japanese companies covering all types of quality of work within the company. These parameters may include plant utilization factor, attendance rate of workers, required setup/retooling time, incidence of disasters/fires etc. in the works. It is a matter of quality control philosophy to strive for a consolidation of the corporate system using the methods of quality control. This type of approach should be adopted by the Argentine auto parts manufacturing industry in order to improve its structure.

(3) Policy Control

The company's top management formulate and clarify the company's policies on quality to clearly establish the quality objectives. In this context, ISO 9004 points out that specific quality objectives should be drawn up for all department in concertation with these policy formulations. In Japanese companies, these policies are implemented in a consistent manner and the behavior arising from what is termed "policy control."

The company's management philosophy (often expressed in the company motto or company leitmotifs) finds concrete expression in medium- or long-term planning statements, on the basis of which the Chairman (President) of the

company enunciates the management policies for each fiscal year (including the goals to be achieved and the measures to attain these goals). On the basis of the Policy Statements of the Company President, all employees at all levels and in all department, will fix the policies, goals, and implementation plans for each specific workplace to define in specific terms what needs to be done and how it should be done. The details to be determined by and for each department are as follows.

1) Achievements/results of the previous fiscal year, reconsidering past errors with ways to do better next time, problems areas that have been identified. Establishment of goals on the basis of a list of main action objectives to be executed by one's own department.

2) Analysis of the factors required for objectives achievement.

3) Assigning goals to each workplace or site on the basis of the above analysis and laying down the means of achieving these goals.

In this manner, the objectives and implementation plans developed through to the last workplace are monitored by regularly checking the achievement results on a monthly or quarterly basis. If it should be recognized that execution is not possible as planned, the reasons and causes for this must be identified so that the necessary corrections or amendments can be made to the plans. This will help establish a suitably amended plan next time and promote control in accordance with the PDCA methods.

(4) Quality Assurance System

The quality system referred to in ISO 9004 is drawn up in the form of a quality assurance system chart for ease of comprehension. TQC is developed in accordance with the standards known as "quality assurance standards" which

are concrete expressions of this system. This is one particular feature of TQC implemented by Japanese companies.

The philosophy of quality control in Japan, is based on the view that quality control is a whole-company activity and that it is naturally a part of quality in that it reflects the day to day tasks completed in accordance with the specified system for quality control. The departments and sections that make up, the company have their task (competence) range and responsibility sphere defined, in terms of quality assurance, in a manual that constitutes the quality assurance system.

Moreover, if any problems arise under this quality assurance system, the locus (person or department/section) of responsibility is clearly defined and traceable and the actions required to redress the situation can be taken immediately.

In this quality assurance system chart, all corporate actions are given in a real-time sequence. These activities include planning, design, test manufacture, testing, production setup, initial flow control, mass production, and service.

The steps given above as planning, design, test manufacture, testing, production setup, and initial flow control form a series or a block grouped as the development stage. The mass production and service stages are extra stages so that the process as a whole can be said to consist of three stages.

At each of these stages, tasks are performed by each organizational entity. These tasks are reviewed and approved at comprehensive meetings in the implementation of quality assurance.

As each organization completes the tasks it is given to fulfil, the internally defined rules - in-house

regulations, manuals, and specifications - are observed. For the tasks to be thus performed in accordance with this quality assurance system, it is essential, first of all, that such internal standards or regulations should be provided.

(5) QC Circle Activities

In Japanese companies, people working at a given workplace form groups. The people of each group will discover problems arising at this workplace (mainly problems associated with quality) for themselves, and will engage in activities designed to resolve the problems through their strength and through a self-imposed effort. This is referred to as QC Circle Activity. The general policies are spelt out from the top and goals are ultimately defined even for the remotest front-line workplace in the works. (Policy Control)

The goals defined for a given workplace are understood by the members of a given QC circle as their own problems and they will show an ongoing commitment to resolve the problems concerned through a self-imposed effort. In this manner, the important QC objectives are attained with a quality control effort in which all employees participate, from the company President down to the remotest front-line operator.

With the QC circle activities, there is a control level. The effect of these QC circle activities ensures that problems at the workplace are improved in various ways. This is also effective in raising morale in that it creates a "happier place to work," and helps enhance the foreman's/superivor's leadership. QC circle activities were initially started by the production department and especially the shopfloor operators to improve quality and to prevent errors. Their activities have gradually widened in scope and include improvements in efficiency,

improvements in equipment, reduction in costs, enhancement in safety, etc. The sphere of these activities has also spread out to the ancillary departments and indirect department to produce some startling results.

The following points may be expected to be achieved with QC circule activities.

1) Direct contribution to the company's results/ achievements (It's for the company)

2) Creating a happier place to work in (it's for the workplace)

   QC circle activities involve the cooperation of all employees at the workplace with a view to resolving the problems arising at the workplace as one objective. As a result, each and all employees at the workplace will mutually think about and align their actions or behavior to improve human relations at the place of work and produce a strong team.

3) Growing as humans (it's for me)

   Getting together with people at the workplace for joint action makes it possible:

   . to consider the way the other person thinks and feels ... this widens the mental horizon.
   . to take a joint effort ... adopt a positive attitude.
   . to talk in a free and relaxed atmosphere ... creating free creative thinking.

   These activities also have an educational (self-enlightenment) function as the employees will learn and study the methods there are for solving problems and acquire technical knowledge and capabilities, obtaining a clearer understanding of the way the process works and the underlying

technical principles. This gives those engaged in production the satisfaction of greater confidence.

The startling spread of QC circle activities has made a significant contribution to mutual understanding with the organization of QC circles on a nationwide basis.

The startling success of QC circle activities in Japan has in part been attributed to the national characteristics of the Japanese and it has been felt that QC circle activities owe their spread and have "caught on" so well because they match the Japanese mentality, behavioral characteristics such as the life-time employment system of Japanese companies, the loyalty the Japanese feel toward their companies, and the gregarious instinct of the Japanese (awareness of belonging to a group). It may not necessarily be possible to introduce Japanese-style QC circle activities and transfer them to Argentina as they are, seeing that the Argentine have national traits of their own. Despite the differences in national character, it is hoped that Argentina will develop a way of feeling and thinking which identifies the company's failure with personal failure and the company's success with personal success. It is hoped that such an awareness of group belonging and small group activity (group identification) will also strike roots in Argentina.

(6) Company President's QC Audit

All activities under the total quality control (TQC) concept ranging from policy control to QC circle activities are monitored not only through documents but also a procedure known as "company president's QC audit." In this audit the company president himself "vets" the TQC activities and how TQC is taking shape. These auditing procedures by the company president are conducted on a regular basis in Japan. Generally, each department manager vets his own department first before

the company president conducts his QC audit. As a result, the manager will realize the problems in his own department and formulate for himself measures to overcome these problems. When the company president performs the audit, he will be given a report with full data and documentary backup to fill him in on the results of the preceding self-administered audit.

Thanks to this company president's QC audit, all areas of management below the president will have a very clear idea of the actual state of TQC and of each control level in each department. It will serve as a valuable data source for reflecting on whether the company president's policy formulations and his guidance were appropriate or not. This makes sure that the problem areas in each department are fully understood by every departmental manager and that an attitude is created which will promote the execution of work tasks in a planned manner.

It is recommended that such a system should also be introduced in Argentina's companies.

CHAPTER 2 - PROPOSAL FOR PROMOTION OF AUTO PARTS EXPORT

Proposal

> The auto parts industry shall establish a production system by division of work with the automobile industry through improvement of quality, then promote export after setting up cooperative relationship between both industries.

Reason for the proposal

For the automobile industry in Argentina, which has to pursue the scale merit arisen from mass-production and mass-sales, if it seeks after the mass under such economic and social environments, it has to develop the demand by expanding the target customers and markets and increase its production and sale.

1) Improvement of quality control: Described in Chapter 1

2) Establishment of production system by division of work

"Objectives to establish"

I. Negotiation shall be continued by explaining quality control system, production technology, production capacity, production management and management system of own company and by submitting the quotation of own products(offer) to supply parts for new model cars to car assemblers in Argentina. This shall be performed in addition to supply of parts for conventional models, and for new models cars introduced in and after 1986 as example.

II. Quality, price and delivery conditions for models cars sold up to now shall be offered to car assemblers in Argentina and its affiliated service shops in order to supply parts for repair and replacement.

III. Negotiation shall be continued by explaining performance results of supply to car assemblers in Argentina and the evaluation, quality control system, producton technology, production capacity, production management and management system of own company and by submitting the quotation of own products (offer) to supply parts through export to car assemblers in Central and South America.

IV. Quality, price and delivery conditions for exported cars shall be offered to car assemblers in Argentina and its overseas affiliated service shops in order to supply parts for repair and replacement through exports.

V. Parts for repair and replacement for cars currently used shall be offered to car assemblers and the service shops in Central and South America after attaining the objective in the above III to supply through export.

VI. Performance results of supply stated in above I to V and the evaluation, explanatory literature for systems of own company and quotation of own products shall be presented to car assemblers in Europe and USA to negotiate concretely and supply through export.

Ranking of auto parts enterprises specified in the Chapter 2 and the objectives that such parts companies should consider for the production system by division of work shall be as follows.

Table ii-1-20 Ranking and Objectives

Ranking	I	II	III	IV	V	VI
A	○	○	○	○	○	○
B	○	○	○	○	○	◎
C	○	○	◎	◎	◎	◎
D	○	○	◎	◎	◎	◎
E	◎	◎				

Mark ◎: Objectives, Mark ○: Current state

Every product has its problem of life cycle. Car models stopped in production fall rapidly from the period of maturity into the period of decay, and end after the durable years. On the other hand new model cars are at the period of introduction, then they develops to the period of maturity from the period of growth with the quantity increased. Such new model cars should be commonly recognized as the first subject for the production system by division of work in point of not only enlargement of production and sale, but also technology improvement, and the system by division of work should be established by both to replace imported parts.

Auto parts are integral parts of completed cars though they serve partially as parts or components for completed cars. They are combined with completed cars, and used as repair and replacement after completed cars are sold. Therefore the sale of parts for repair and replacement takes a form to be sold to car assemblers or the affiliated service shops normally. In case of export, export of completed cars with parts combined has priority, after which parts are exported for repair and replacement. Such completed cars with parts combined can be sold in overseas markets when they have general international competition power comprising quality, function, design, sales price, sales channel and promotion activities etc.

The international competition power of completed cars is not only the power created by car assemblers but the international competitiveness in aspects of quality, cost and delivery of parts, which play an important role. The international competition power is created by many area such as industry of materials serving auto parts industry as processing industry, energy industry, related industries such as service industries as bank and transportation industries, labour unions, educational institutes and government etc., say through full cooperation of private and public sectors. When the auto parts industry in Argentina mainly composed of small and medium enterprises plays its role and shares responsibility with car assemblers to develop competition power, then completed cars can be exported. To share respective role and responsibility by both car assemblers and parts companies and to establish a joint system and production system by division of work through cooperation will enable it to export completed cars.

The automobile industry in Argentina already forms a part of international production system by division of work as shown in the export and import value for parts and components. If the production system by division of work is established with car assemblers in Argentina, the auto parts enterprises in Argentina can participate in the international production system by division of work and establish it in Latin American countries and even in European and American countries. That is to say, they can constantly supply parts and components to manufacturing plants of automobiles and knock-down plants located in such countries of Latin America and Europe/America.

The auto parts industry was created prior to the automobile industry. Historically the target market for the inudstry was not the automobile industry, but the auto parts inudstry, and both of the industries have to

devide the production work between them in the future. General share of roles and relation between the automobile industry and the auto parts industry will be summed up as follows.

Automobile industry	Auto parts industry
Capital-intensive process	Labour-intensive process
Process where a certain scale is required	Process where smaller scale is acceptable
Machine facilities with higher technology	Relatively simple machine facility
Internationally high technology level	Relatively low technology level

Main reason why car assemblers order auto parts to parts companies outside will be that they can make use of specialty technology of parts enterprises and also lower cost can be materialized than that made inside factory. Major reason why parts companies receive orders of parts is that they wish to establish long-term business relation with car assemblers which will be stable order that they can expect export and technical information and assistance, and also information on customers and markets abroad can be received. Both industries exist under cooperation and supplementary relationship essentially.

Overseas markets are also for all car assemblers in Europe, America and Japan, and requirements for all aspects such as quality, cost and delivery by customers and markets to the automobile and auto parts industries in Argentina will become strict more and more highly under the situation where technology innovation develops more highly in automobile industry. The responsibility of roles shared by both parties will also become heavier. It is more important to make the relation between them closer with communication channel secured while making interchange of detailed message more active.

The factors which connects both industries tightly are quality and their management which are common objective.

3) Export promotion

The export promotion is attained by practical activities of enterprises not by theory. It is achieved by expanding the management resources of both software and hardware of enterprises through practical activities and by performing further aggressive practical activities.

"Steps to promote export"

I. Customers and markets overseas should be studied and clearly understood

Investigators:

(1) Auto parts enterprises

(2) Industrial association of auto parts

Investigated	Items to be investigated
(1) Automobile companies and automobile industrial association home and abroad	Production plan by models of car, car numbers per model owned etc.
(2) Service shops affiliated home and abroad	General industries, conditions on enquiries etc.
(3) Makers of materials to be purchased	Overseas environments, laws and business custom etc.
(4) Diplomatic offices abroad	General overseas environments
(5) Industrial association of auto parts abroad	General auto parts industries, co-existence relation etc.
(6) Auto parts enterprises abroad	General auto parts enterprises, tie-ups etc.

II. Selection of customers and markets

Car plants, knock-down plants and affiliated service shops abroad should be selected and target customers to be fixed.

III. Proper combination of quality, quantity, price, channel and sales promotion of products to be exported

To meet customers requirements for such as product, quality, quantity, competitive price in overseas markets, network for sales service through own company or agents, network for transportation and storage and method of sales promotion.

IV. Negotiation to be made concretely

V. The results produced after performance shall be reviewed both by enterprises and industrial association, and improved export promotion measures should be defined to carry out.

The export promotion work begins with overseas marketing activities by auto parts companies and the industrial association of auto parts and with identification of target customers through investigation of customers and markets abroad. For the time being the target market shall be set for Central and South America, and efforts in marketing shall be done to occupy share of 1% of genuine parts for the total quantity owned in 1988 (about 29 million cars), and 10% of production quantity of cars (about 1.8 million cars), that is, parts for 470 thousand cars as export target. From the viewpoint of activity efficiency, 12 countries in Table ii-1-21 will be target markets which are common to both the auto parts companies and the industrial association of auto parts.

Promotion of export can be performed by active transaction between customers abroad and parts companies in Argentina (companies of automobiles) on the private basis, and more concretely speaking exchange between commodities and fees, and transfer of proprietary right is made active. This means that exchange between commodities (service) and its fees will become more active together with personal relationship between enterprises and with business information, by concluding sales/purchase agreements enterprises and by fulfillment of such agreements by enterprises concerned.

Export is such business as to be done by individual enterprises. Not only domestic laws in the country to be exported but also international laws and regulations as well as international business custom shall be observed, and contracts should be concluded to perform thoroughly. Investigation of customers/ markets is made first and international competitiveness of own products is precondition on export agreements. For this purpose, aggressive marketing activities should be performed as promotion activities etc. where quality and function of products meet needs of customers/markets of the import countries, price requirement is met, no friction is caused for distribution established in the country and messages contained in products and catalogues etc. are well transmitted and accepted.

Processes taken up to performance of contracts are composed of series of activities to be carried out, say information activities such as marketing information etc. on general/particular situation of foreign countries and on customers/markets, and providing catalogues/samples to get communication with customers, and enquiry - quotation - negotiation - contracting - performance - aftercare service as

detailed business negotiation. And for this purpose it is required to establish and arrange international network orderly of communication service system such as telephone, letter, facsimile and telex etc., and it is quite important to assign many personnel who can act with international knowledge and experience.

CHAPTER 3 - PROMOTION OF THE NATION-WIDE QUALITY CONTROL ACTIVITIES

3.1 Problems in the Diffusion of Quality Control

3.1.1 Enhancing the Educational Function

The primary elements for the promotion of quality control education are:

(1) Quality control education and guidance

Seminar sponsorship, mass-media presentations, rotating guidance programs, correspondence education

(2) Quality control symposia

(3) Surveys and research on quality control issues

(4) Publication and sale of books and journals related to quality control

(5) Sponsorship of information about quality control

(6) Participation in international quality control activities of these, the most important is (1), Quality control education and guidance.

In Argentina there are many such functions in operation. The center of the network is the Presidential Overall Quality Program.

Organizations conducting promotion activities can be divided into two types:

There are organizations conducting specialized courses on quality control such as INTI, IACC, ASADECC, CGI and UTN universities. Then, there are the many research centers conducting research in proprietary technology, such as CNEA, YPF, and the INTI-Centers, who incorporate quality control technology including statistical control methods into their training in specific technologies.

We were not able to investigate the latter group in detail, but the instructors have achieved very encouraging success through their use of quality control methods.

The Presidential Overall Quality Control Program is making strides, along with the diffusion of quality control and education of human resources programs of its The Technical Groups of the Product Quality Service Committee. This organization is at the center, and the highest level, of Argentinas policy to promote diffusion of quality control.

Its members come from IACC, INTI, CGI and UTN University besides other important authorities. Each of these holds specialized quality control courses for members of the public. An estimated seven thousand individuals have completed IACC courses, plus 500 for INTI, 300 for CGI including 133 trained in Japan, and 250 for UTN University. We would thus expect the committee to take a leadership role in the Argentine policy for diffusion of quality control. Each organization has programs at a wide range of levels, from managers to foremen, but each also has its own particular area of focus. IACC concentrates mainly on Tecnicos (engineering graduates of technical high schools), while CGI gives particular emphasis to the introduction of Japanese quality control methods for managers and engineers in the medium and small companies. INTI holds the only specialized course in the national research institutes, emphasizing control systems like those in the ISO 9000 series.

UTN University has decided to hold joint lectures with ASADECC for university graduates. ASADECC, while not a member of the committee, has some 3,000 graduates of its seminars aimed at managers and QC circle leaders.

We believe that it is proper for each of these organizations to have its own particular objective, and to determine its target group and the content of its lectures. The diversity of this approach, however, leaves us feeling that a more efficient educational system would be preferable. We would

hope that the educational functions could be systematized within the Presidential Overall Quality Control Program.

It is noteworthy that the Presidential Program is considering introducing quality in mainstream education, making it possible for quality awareness eventually to be introduced at the elementary school level.

3.1.2 Establishing Standard Texts

The table on the next page shows the results of our survey of human resource development seminars taught by quality diffusion and promotion organizations. On the seminars surveyed, special attention is warranted by the IACC Quality Control I, Quality Control II and Statistical Methods, and Quality Control for Workers, Foremen and Inspectors, the ASADECC Quality Control Seminar for Managers and Supervisors, and Using QC Circles, and the joint ASADECC - UTN University Quality Engineering (in preparation), as well as the INTI-MECANICA Seminars for Establishing Quality Systems.

The most important consideration in designing a seminar is probably the teaching materials. However, in all these organizations, only IACC has an established text, used for its Quality Control I seminar. In other seminars, the sponsoring organization accepts materials written by the instructor, which are usually no more than prompt books for the lecture. Some seminars have texts in preparation. In general, text preparation is a matter of concern among the individuals responsible for the seminars, so that this matter may properly be viewed as important.

The curriculum of a typical seminar is summarized in the next section.

List of Primary Quality Control Seminars in Argentina

Organization	No.	Seminar Name	Target Group	Length (Hrs.)	Graduates	Text
IACC	1	Quality Control I	Managers, Engineers	40	3,500	QC (I)
	2	Quality Control II and Statistical Methods	" "	40	500	Prepared by instructor
	3	Factory Experimentation	" "	40	250	"
	4	Mechanical Measurement	Foremen, Engineers	52	1,000	"
	5	Quality Control for Workers, Foremen and Inspectors*	Workers, Foremen	40	2,500	"
	6	Statistical Process Control	Managers, Engineers	30	140	"
	7	Basics of Inspection by Attributes	Engineers	24	60	"
	8	Value Analysis	Managers, Engineers	24	120	"
ASADECC	1	Management training about TQC*	Managers	20	20	Prepared by instructor
	2	Quality Organization and Their Administration*	Managers, Engineers	12	240	"
	3	Quality Assurance	" "	16	240	"
	4	Quality Auditing	" "	16	120	"
	5	Using QC Circles	" "	18	150	"
	6	Training for QC Circle Leaders	Foremen, Engineers	18	120	"
	7	Determining Process Capabilities	Engineers	36	120	"
	8	Reliability of Electronic Instruments	"	25	60	"
(UTN)	9	Quality Engineering*	"	350	-	In cooperation with UTN In preparation
CGI	1	Participating in Quality Control	Managers, Engineers, Foremen	12	-	Prepared by instructor
	2	Introduction to TQC	All Levels	15	-	"
	3	Introduction to Creativity	Managers, Engineers, Foremen	14	-	"
	4	Using the Seven Tools	" " "	15	175	"
	5	Introduction to Quality Assurance	Managers	12	13	"
	6	Planning Quality System	Administrator, Managers, Engineers	15	-	"
INTI	1	Quality Design of Products	Engineers	6	-	Prepared by instructor
	2	Quality Auditing	Managers, Engineers	18		"
	3	Total Quality Control*	" "	32		"
	4	Quality Assurance	" "	18		"
	5	Manufacturing Process Control	Engineers	18	500	"
	6	Preparing Quality Manuals	"	18		"
	7	Reliability	"	6	-	"
UBA	1	Technical Statistics	Grade students	64	5,000	Prepared by professors
	2	Superior Statistics	Grade students	64	80	"
	3	SQC & TQC	Grade students, Engineers	8	6,000	IACC books
	4	TQC (main points)	" "	4	5,000	Prepared by professors
	5	TQC	" "	64	200	Ishikawa, ISO, etc.
	6	TQC	Manager	12	250	Ishikawa, Juran, etc.
	7	TQC	Post Graduate	25	60	Ishikawa, etc.

* Curriculum details are presented in the following tables.

ASADECC & UTN : Quality Engineering

No	Item	hours
1	Probability and statistics	30
2	Statistical Control of Quality	40
3	Experiment Design	20
4	Reliability	32
5	Metrology	30
6	Inspection and tests	30
7	Quality Organization and Management	30
8	Legal responsibility for the Product	10
9	Quality Costs	12
10	Quality Audits	16
11	Quality Assurance	16
12	Motivation for Quality	18
13	Monograph and practic work	56
	Total	350

The curriculum content of these seminars is quite comparable to similar seminars in Japan. The QC circle concept appears to be practically identical, due to the efforts of CGI, ASADECC and IACC to promulgate Japans TQC philosophy.

Based on these findings, we would expect that some experienced countries could cooperate in developing seminar texts based on examples from manufacturing of advanced countries. There should probably be texts for managers, QC engineers, and foremen as well as QC circle guides.

3.1.3 Cooperation with Certification Bodies (e.g. IRAM) and Disseminating Organizations (e.g. IACC)

The international standardizing organizations ISO / IEC are calling for the establishment of certification systems on a global scale. Naturally, such a certification system assumes a level of industrial technology sufficient to meet the required quality standards. There must be close contact between the certification bodies and quality diffusion and promotion organizations of quality control, to bring both the quality system and the level of product quality to international standards, and to encourage appropriate quality control activities. Increased cooperation between these organizations is needed. Items for present attention include preparation of company standardization manuals, quality systems, the reading and distribution of technical materials including standards, and a cooperative relationship such as between IACC and IRAM in Cordoba.

3.1.4 Speeding Up Service at Testing Laboratories

In Argentina, government-operated testing laboratories (research centers) are responsible for certification testing and also perform services for enterprises. Services performed include consignment inspection and testing, instrument calibration and providing technical guidance. Companies lacking the proper testing and inspection equipment must rely on outside sources for this service. If such work is performed accurately and promptly, quality control can proceed smoothly, but in actuality there are many complaints from the public about the lack of prompt service, and inability to calibrate instruments within comparatively lenient time frames. The calibration system has not yet accommodated private inspection and testing facilities, and no progress is being made in this direction. An efficient system needs to be set up at the earliest possible opportunity, to provide the speedy feedback that is essential to good quality control.

3.1.5 Seminar Instructors

In education of human resources to deal with quality control, the abundant instructors is of equal importance with the development of texts. Of the quality diffusion and promotion organizations in Argentina, only IACC has a history of any length. Thus it is unlikely that graduates of quality control courses have entered many industries in sufficient numbers, and the demand will only increase for more such graduates who have been trained by outstanding instructors. The best-known course, IACC-Quality Control (I), graduates only 150 trainees annually, and IACC-Quality Control (II) only 30 per year.

Instructors may be trained either domestically, or through research study with overseas organizations. University courses would seem to be the most likely channel for domestic training.

Especially deserving of mention is the two-year, 350 hour Quality Engineering course being planned at the UTN campus in Buenos Aires. This course is designed for a small number (30) of post-graduates with the cooperation of industry. We believe this course could be an ideal training ground for seminar instructors. The program began with a cooperative agreement between ASADECC and UTN in February 1990, and text development and other preparations are speeding toward an opening scheduled within the year.

Overseas study activities at present include CGI and INTI study programs in Japan, and IACC study in Japan and France. Also, IACC is pursuing certification of quality engineers with the ASQC in the USA. The engineers who receive the first of these certifications, expected in 1991, would also be strong candidates for seminar instructor positions.

3.1.6 Geographical Factors

In Argentina, some 50% of the population is concentrated around the capital city, so that other regions are very sparsely populated. There are industrial regions outside the capital, such as in Cordoba, Mendoza, Rosario and Santa Fe. And the government has a policy of encouraging industrial development in remote areas such as Tierra del Fuego. Attention must therefore be given to providing services to support the promotion of quality control in such remote areas. IACC has facilities in Cordoba and Rosario, with another scheduled to open in Entre Rios in the near future. But the services in Tierra del Fuego cannot be called satisfactory. What is needed there and in Mendoza is the type of organization found in Cordoba, Argentinas second largest industrial area, where IRAM, INTI and IACC all have branches. Important services include access to standard and technical materials, seminars, quality control consultants, and facilities for calibration and certification of instruments.

3.1.7 Educational Facilities

Classroom facilities are the most urgent need. Classrooms maintained at present by IACC, INTI, ASADECC and CGI include one for ten persons, one for fifteen, two for twenty, two for 35, and one each for 50 and 60 persons. Private facilities are borrowed for seminars in outlying areas. The permanent facilities, each owned by one of the organizations, are distributed in five areas.

Expanded classroom facilities are essential to the expansion of quality control promotion activities. Important consideration for future facilities would include convenient transportation, large classrooms that can be divided, and systems for indexing resource materials.

3.1.8 Quality Control in Corporations

We observed 13 factories, including metals (1), automobiles (2), agricultural machinery (2), machining (2), electric home appliances (3), textiles (1), and IRAM qualified factories (2). The sample covered a wide range of industries, but not a sufficient number of factories to provide a basis for evaluation.

The level of quality control activity in each of these industries was so widely varied as to make a single description impossible. In general, the level was highest in industries with a significant amount of export sales, such as oil field piping. Common observations that we were able to make are presented below.

(1) Instilling the TQC Philosophy

During the present (1990) economic crisis, the attention of the top management focused on economic survival, so that it may be unavoidable that quality improvement is receiving little attention. Quality, however, remains the final issue not only internationally, but in the domestic market as well. This is why ASADECC and CGI are putting their energy into raising managers quality consciousness. Nevertheless, we saw very few companies being led by management with a high level of quality consciousness. The process of instilling the TQC philosophy in managers, engineers, foremen and workers must begin with management.

(2) SQC

In all processes, from material control to delivery control, application of SQC techniques are weak. There were a few examples of seven tools, control charts, histograms, and the like, but neither the analysis of data nor timeliness of feedback were sufficient. The process of quality control relies heavily on the concept of inspection as a means of assuring quality and generous attitude toward the defects repairs.

(3) Company Standardization

The Five Ss, a basic concept of standardization and quality control, are not sufficiently utilized. Examples of written standards were the exception rather than the rule. In some cases external standards or purchasing specifications were used directly in plants. Here there is a need to set company standards appropriate to the manufacturers own level of technology. In other cases, quality campaign messages were evident on bulletin boards or posters, and company standards were used, but at widely varying levels in different companies.

(4) QC Circles

QC circles are considered an important link in the TQC process. In execution, however, they are very weak. There were examples of QC circles being led by enthusiastic managers, but in the factories we visited there was no QC circle activity at all. The main reasons for this were said to be the social environment and employment conditions, but there are companies that are making determined efforts at holding QC circles. We may expect that they could become a starting point for diffusion of quality control.

(5) Measurement Control

Measurement control is the basis for the gathering of accurate data. The factories we visited appeared to be weak for this activity on all levels. For example, instrument logs, calibration records, expiration date displays, and sample retention were inadequate.

(6) IRAM Standards and Recognition of the IRAM Certification System

Except for the IRAM-certified factories, there was generally little knowledge of IRAM. This low recognition rate is probably due to the fact that few companies use

IRAM standards. For quality control efforts to advance, it will be necessary for companies to recognize the IRAM standards are quality standards, to use them as a basis for their own company standards, and pursue IRAM certification. This will in turn help to further establish the influence of IRAM standards.

3.1.9 International Technology Exchanges

International exchanges of technology related to quality control are important for trade and technology transfer. In this connection it is essential to obtain the information available from the ISO/IEC, the European Community (EC), United Nations (UN) and other international organizations. It is important to participate in technical committees of international organizations concerned with the major products of ones own country, in order to gather information and present ones own point of view. Also, translation of national standards into the languages of international standards (English and French) is a means of introducing them to the world. At present, Argentina is in the unfortunate position of being cut off from ISO information, and with no English translation of the IRAM standards.

On the other hand, the hosting of the 1989 International Conference on Quality Control is considered to have had a great effect on domestic industry. Exchanges are continuing at present in the form of overseas study assignments and invitations to influential specialists. It is hoped that this will continue, and that those returning from overseas study will become a nucleus for diffusion of quality control at home.

3.2 Directions for Problem Resolution

3.2.1 Government Organizations

(1) Presidential General Affairs Office (Secretaria General-Presidencia de la Nacion)

The Overall Quality Program (Plan Global de la Cualidad) is the standard bearer for the advancement of quality control in Argentina. This organization is expected to set quality control policies and provide guidance to the various cooperating organizations. Unfortunately, neither the enforcement arm of this program, the Products Quality Service Committee, nor its subsidiary organization, the Technology Group, have achieved much in the way of success since their inception. This is the perfect government organization to prepare plans to deal with problems of education, certification, testing, measurement, export inspection and related information, and it is hoped that it will quickly be able to achieve results in the four major target issues (presently laboratory accreditation, diffusion of quality control, education of human resources and resolution of industry-specific problems). To achieve this it is important that the various public and private-sector members of the committee of program make positive contributions.

(2) Industry and Commerce Office (SIC)

(Sub-secretaria de Industria y Comercio-SIC) Norma-Argentina Committee and CALEX in SIC are expected to establish national standards and serve as an information source for exports, however as of this time, the results have not been fully satisfactory. We would like to see them fulfill their role as disseminators of information in assistance of the Presidential Overall Quality Control Program.

We were claimed financial crisis by nearly every public, private and non-profit organization with whom we met

discussed the financial crisis. Diffusion of quality control would be difficult without sound financial support.

3.2.2 Disseminating Organizations

(1) Establishing a Committee for Exchange

The principal organizations in the diffusion of quality control are IACC,INTI, UIA, CGI, the universities and ASADECC. ASADECC is not a member of the Presidential Overall Quality Control Program, however it should be nominated for membership. Each of these organizations has its particular educational policies. It would be helpful to have an Exchange Committee (suggested name) in which to discuss the content of educational efforts and present suitable suggestions to the Overall Quality Program. This committee should include the above-named promoting organizations plus specialists from the government and private sectors. Subjects to be addressed would include seminar curriculum, information exchanges and policy recommendations.

The issue of cooperation between the standard-setting and certification body IRAM, and IACC and the other Disseminating organizations could be resolved by requesting IRAM to participate in the Exchange Committee.

(2) Standard Texts

Texts must be prepared for every level of instruction. Each of the disseminating organizations is preparing its own texts, but only a limited number are available for sale. From both a theoretical and a practical point of view, the diffusion of quality control would be speeded by the development of comprehensive textbooks for each level.

Textbook preparation requires the participation of quality control experts from all types of industry. This

would require the formation of a committee to edit quality control teaching materials in Argentina. Advanced countries would be able to offer technical cooperation based on considerable experience in this area.

The recommendable structure of such a committee is outlined below.

1) Name
   Argentina Quality Control Textbook Editorial Committee

2) Organizational Relationship
   IACC or INTI under the direction of SIC

3) Composition

   Chairman: To be chosen from IACC or INTI

   Members: Specialists nominated from IACC, ASADECC, INTI, CGI, UIA, IRAM and universities (UBA, UTN, UAE)

   Advisors: Two foreign experts

4) Types of Textbooks to be Prepared

   - For Managerial Levels
   - For Foremen
   - For Quality Control Engineers
   - For QC Circle Leaders

5) Principal Textbook Contents

   A. Seminar length in hours, exclusive of homework assignments, should be approximately as follows for each level of trainee:

      Seminars for the management: 40 hrs.
      Quality control engineers: 150 hrs.
      Foremen: 40 hrs.
      QC Circle leaders: 100 hrs.

B. Contents should be suited to Argentinas industrial and social environment. Sample problems and class exercise problems should be selected in consultation with foreign experts.

C. Seminars for QC circle leaders should focus especially on conditions particular to Argentina. (There is a general feeling that overseas experience cannot be directly applied here.)

6) Language

Text books should be prepared in English, for translation into Spanish in Argentina.

7) Time required

Text preparation should take about three years.

(3) Seminar Instructors

Instructors must have completed a suitable training course themselves. We believe that either the IACC Quality Control (I) and (II) courses, or the UTN-ASADECC Quality Engineering course for university graduates (scheduled to begin in 1990) would be suitable.

Additional experience may be gained through study assignments in developed countries overseas, or participation in seminars with experts invited from overseas.

We also suggest that Argentina consider establishing its own standard for qualification of quality control engineers, with reference to the ASQC program which the IACC is studying in the U.S.A. The procedures involved could be similar to those for meeting the standards for technical proficiency for a welder under IRAM-IAS U500-138, or for a non-destructive inspection technician under IRAM-CNEA Y500-1 003.

(4) Geographical factors

Services to outlying regions are often inhibited by geographical factors. Branches of disseminating organization promotional and certification bodies should be established in such places as Mendoza and Tierra del Fuego.

If this is difficult, however, these functions may be entrusted to an appropriate local organization, and the necessary computer terminals, facsimile connections, copiers, standards, bibliographies, reference and audio-visual materials supplied to support the demand for services.

3.2.3 Testing Laboratories

Increased testing and inspection equipment and personnel are needed to provide timely support for company quality control efforts. First, however, a reliable service network must be established. To do this, complete implementation should be made of (1) a laboratory accreditation system, and (2) a calibration service (SAC, Servicio Argentino de Calibraciones).

Work is already in progress on both systems. An accreditation system for testing laboratories is expected to be addressed under INTI as a project of the Presidential Overall Quality Control Program. It is expected that some time will be required to achieve the target level of full international accreditation under ISO Guide 25. For the time being, we believe it would be efficient to incorporate into the system

(1) Testing and inspection organizations maintained by government and private sector enterprises

(2) Privately owned specialized testing and inspection companies such as CAIDIRA's members

Existing plans for the advancement of a calibration service (SAC) should be expedited. This would undoubtedly enhance the

quality control capabilities of manufacturing industries.

3.2.4 Standard-Establishing Organizations

The reasons for the low level of recognition of IRAM standards were discussed above in section 3.1.8 (6). A recognition campaign, both within Argentina and internationally, is needed. The domestic campaign should present IRAM standards and the IRAM certification mark to both manufacturers and users. Consumers have little chance at present to become acquainted with the IRAM mark because it is seldom seen in the market, but establishing its reliability as an indicator of quality could help establish it as the mainstay of quality.

The first step in the international market is English translation of the IRAM standards, in order to promote exports by gaining recognition of the quality standard of Argentinas products. The best idea would be to begin with a translation of the catalog of standards.

As noted in section 3.2.2 (1), it is naturally also necessary to participate in the cooperative efforts of quality control promotion organizations.

3.2.5 Enterprises

Improving quality is naturally an exclusive problem of an enterprise own, but when it lacks the necessary specialists and leaders, it should take maximum advantage of external resources. These are, namely:

(1) Quality diffusion and promotion organizations (IACC, UTN, etc.) for human resource development and quality consulting

(2) Standard setting organizations (IRAM) for certification and domestic and international information gathering

(3) Testing organizations (INTI, etc.) for testing and inspection services and instrument calibration

(4) Information organizations (SIC, INTI-international division, etc.) for market surveys and export-related information

Internal policies should naturally be directed at laying the foundations for a TQC system, but we have learned that there are factors making quality control circles difficult to implement in Argentina. It is of course necessary to train QC circle leaders, but we also believe that reward systems for effective improvements should be established to encourage worker participation. This would help to build a record of rewarding workers efforts.

CHAPTER 4 - PROPOSAL FOR INTRODUCTION OF AN EXPORT CERTIFICATION SYSTEM IN ARGENTINA

4.1 Introduction

How to produce internationally competitive goods, and how to expand participation in international markets, are major policy concerns of all nations. For the Republic of Argentina, however, with its dramatic drop in industrial production, high unemployment rates and massive external debt, these problems are extremely urgent.

An internationally competitive product must have quality, reliability, design, price and service features that are above international level. Each and every one of these objectives can be efficiently met through a company-wide quality control program.

As export certification programs can be a powerful means of promoting company-wide quality control or total quality control efforts it should be formulated and operated so as to encourage such efforts, and must also function as a regulatory mechanism to prevent the export of inferior products, which can result in significant damage to the reputation of all of her products. At present, Argentina has no effective regulations to prevent the export of inferior products. We believe that there would be merit in introducing an export certification system with the functions discussed in this section.

The objective of the proposed export certification system is to promote the export of manufactured goods, and we accordingly give it the provisional name of Manufactured Goods Export Certification System (hereafter abbreviated as the export certification system.)

4.2 Steps in Introduction of the Export Certification System

Although SIC has, the final authority and responsibility on behalf of the national government for the implementation of the export certification system, it is actually the Export Certification System Advisory Council, formed with the participation of state governments and other related organizations, which will discuss and determine major policy items. The main role of SIC will be to provide administrative execution of the decisions reached by the Council. The involvement of state governments in this process is very desirable.

Fig. 5-1 Timetable for the Establishment of the Export Certification System

Item	1991	1992	1993	1994	1995
1. Prepare office and clerical support					
2. Form Preparatory Committee					
3. Prepare legal regulations					
4. Form Export Certification System Advisory Council					
4.1 Determine framework of the export certification system					
4.2 Select specific goods (products), prepare standards					
4.3 Prepare criteria for accreditation of certification bodies, begin accreditation					
4.4 Prepare criteria for accreditation of inspection bodies, accreditation					
4.5 Prepare criteria for accreditation of testing laboratories, begin accreditation					
4.6 Determine procedures for product certification					
4.7 Determine examination items and examination criteria for quality system certification					
4.8 Determine qualifications for quality system assessors					
4.9 Determine qualifications for inspectors					
4.10 Determine qualifications for testing practitioners					
4.11 Determine certification marks and logos					
4.12 Determine guidelines for fee structure					
4.13 Determine follow-up procedures					
4.14 Determine measures for exceptional cases					
5. Implement export certification system					...

When items 4.5 (criteria for accreditation of testing laboratories) and 4.10 (qualifications for testing practitioners) are already in existence in other systems in Argentina, it would be preferable to adopt these if there are no obstacles to do so.

4.3 Preparation Required for Establishment of the Export Certification System

(1) The administrative office with responsibility for execution of the laws related to the export certification system should be established within SIC. The duties of this office will encompass a wide range of activity.

(a) Preparation of a law, administrative orders, guidelines and manuals etc., related to export certification system.

(b) Designation of products services or processes subject to the export certification program

(c) Preparation of criteria for accreditation of certification bodies, and issuance of accreditation based thereon

(d) Preparation of criteria and procedures for assessment for factory quality system certification

(e) Preparation of qualification criteria for factory assessors

(f) Preparation of testing laboratory accreditation criteria, and issuance of accreditation based thereon

(g) Determining qualifications for testing, inspection and assessment personnel

(h) Selection of standards for testing and inspection

(i) Preparation of logos, marks, etc. to signify certification

(j) Determination of conditions for inspections by government personnel and Council members and performance of such inspections

(k) Issuance and supervision of cease-export orders

(l) Prosecution of violators

(m) Establishment and administration of the Export Certification System Advisory Council

(n) Performance of promotional activities on behalf of the export certification program

In addition to the above, the office will act on behalf of the national government to pursue reciprocal acceptance of certification programs with other countries and to promote Argentina's certification program overseas, particularly with major export customer countries.

The basic duties listed above represent a substantial workload for the office in addition to matters which are to be determined by the Export Certification System Advisory Council. And even if the Export Certification System Advisory Council is highly efficient, it is only through a capable office that the system will be able to operate efficiently from the start and achieve its objectives.

Thus it is desirable that this office within SIC attracts and retains a suitable number of employees with considerable knowledge of certification, inspection, quality control and other related subjects.

Following is a suggested composition of such an office.

Export Certification Department (within SIC)

- Division Head
- Legal Operations (including cease-export orders, prosecution, etc.)
- Approval of accreditation of certification bodies, and follow-up activities
- Approval and registration of factory assessors and testing and inspection personnel
- Accreditation of testing laboratories and inspection bodies and follow-up
- Supervision of certified products, services and quality systems
- Selection, deletion and recording of standards for testing, inspection and quality system audits
- Promotional activities of export certification system, and liaison with related organizations
- General services (typing, document receipt and issue, etc.)

One person for each of the above functions, for a total of nine.

The above suggested number of employees may be adjusted upward or downward in response to the work load. It is especially important that individuals whose duties require technical knowledge be provided with special opportunities to receive additional education in the latest trends in world certification activity and technological developments, in order to expand their knowledge.

Also, because export activities involve the entire country, responsibilities must be shared with each of the state governments in order to foster the development of related administrative systems in all regions.

(2) Preparatory Committee for the Establishment of the Export Certification System

Establishment of an export certification system requires a great deal of work. Systematic, organized efforts are needed so that individual tasks not to conflict. This should be achieved by first strengthening the clerical organization within SIC, and by attracting and organizing voluntary participants in a preparatory committee. SIC should issue the first call for participants. The call should be directed to a range of participants from the national government, governments of states involved with the production of significant industrial export products (from branches with significant connection to certification and testing), industrial standard-setting organizations, certification bodies, testing laboratories and inspection bodies, organizations involved in quality control education, specialists, lawyers, industrial representatives, exporters and any other interested parties.

It is essential that the committee composition not be weighted toward representatives of any one field.

The work of the committee will be

(a) A full exchange of opinions on the proper structure of the expert certification system.

(b) Submission of a list of organizations and specialists who are desirable to constitute the Export Certification System Advisory Council to SIC. However, because the export certification system must be established and operated by governing legislation, SIC should consider the opinions of the preparatory committee and other related organizations, and promptly establish the required laws.

(3) Providing Legal Basis for the Export Certification System

Detailed descriptions of the items to be controlled by the laws concerned with the export certification system are provided below.

1) Stipulation of Objectives

Objectives should be clearly stated in a law in language such as The establishment of the export certification system has as its objective the enhancement of the quality of manufactured products of the Republic of Argentina, and the development of beneficial export trade through strengthened international competitiveness.

2) Stipulation defining Certification

It is necessary to establish the types and coverage of export certification. This proposal envisions three types of certification: of products, services and factory quality systems. Each of these certification should be clearly defined in the law.

3) Stipulation for Factory Quality System Assessment

For certification of factory quality systems, it is preferable to establish legal regulations governing the principal requirements of factory assessment. These are:

(a) Define situations in which factory assessment is compulsory
(b) Factory assessment methods
(c) Elements and methods of factory assessment
(d) Special requirements for factory assessment

4) Stipulation for Testing and Inspection

Requirements for product certification, namely:

(a) Designation of items to be certified
(b) Types of testing and inspection
(c) Methods of testing and inspection
(d) Standards for testing and inspection
(e) Exceptional cases for testing and inspection

5) Stipulation governing Certification Bodies

The following stipulation, at least, should be established governing certification bodies accredited by SIC to conduct the business of certification

(a) Criteria for accreditation of certification bodies
(b) Responsibilities of accredited certification bodies

6) Stipulation governing Factory Assessors

The success of a factory quality system certification program depends on the recruitment of a certain number of highly qualified factory assessors. For this reason, stipulation should be established providing:

(a) Conditions for becoming a factory assessor, and provisions for registration of factory assessors
(b) The number of qualified factory assessors that must be employed by, or available on contract to an accredited certification body
(c) Education and training of qualified factory assessors

7) Stipulation for Accreditation of Testing Laboratories

Testing laboratories used in the national export certification program must satisfy certain conditions. Legal requirements should be established covering the following:

(a) Criteria for accreditation of testing laboratories
(b) Responsibilities of accredited testing laboratories
(c) Qualifications and registration of personnel conducting tests

8) Stipulation governing Follow-Up of Audits by Government Personnel and Council Members

Legal provision is necessary to allow scheduled and unscheduled inspection visits by SIC personnel and Council members in order to verify that all parties related to the export certification system (accredited certification bodies, accredited testing laboratories, applicants for export certification, exporters receiving certification, etc.) have performed their responsibilities in accordance with legal regulations.

9) Stipulation governing Certification Fees

Costs of testing, inspection and assessment related to certification are normally met through established fees, however, it is advisable to set maximum fee limits in order to prevent excessive burdens on applicants.

10) Stipulation governing Orders to Cease Export

To enable the law to operate correctly, conditions for the issue of orders to cease export must be established.

11) Penalties

Similarly, to give authority to the law, a system of penalties appropriate to the degree of infraction must be established.

12) Stipulation governing the Export Certification System Advisory Council

In order for the export certification system to operate efficiently, it is necessary for the opinions of all related parties to be heard, and a certain degree of consensus to be obtained. For this reason, it is essential to establish a legal foundation for a Export Certification System Advisory Council which will deliberate on matters important to the export certification system and report to the Minister of Commerce. It is important that such regulations establish matters which should be deliberated at the Council.

Naturally, as the legal system defines the basic elements only it will also be necessary to provide further details in the form of administrative orders, guidelines and manuals etc.

(4) Establishment and Operation of the Export Certification System Advisory Council

The Export Certification System Advisory Council should be established under SIC in deliberating and reporting on matters basic to the export certification program. The composition of the Council should combine members of government and the private sector, including representatives of organizations within the national government, state governments, major industries, important export industries, academic institutions and consumers as well as specialists, representatives of certifying and testing organizations, and groups promoting education and improvement in product quality.

It would be efficient for the Council to consist of a general meeting plus several special committees to examine specific fields of interest.

(5) Structure of the Export Certification System

1) Flow of Export Certification Procedures

To provide an understanding of the structure of the export certification system, we will give a simple description of the flow of export certification procedures.

(1) An organization wishing to be recognized by (SIC) as an export certification body submits an application to SIC.

(2) After receiving the application, SIC requests the Export Certification System Advisory Council for an opinion as to whether the applicant should be approved to certify goods for export.

(3) The Council performs an investigation of the applicant, including an audit of documents and other necessary procedures. The Council then refers to previously established criteria for the approval of export certifying organizations, and if the applicant meets the criteria, then replies to SIC that there is no objection to approval for an accredited certification body. The report on investigation is attached to the reply.

(4) SIC then accredits the applicant as an accredited certification body based on the results of (3).

(5) SIC inquires the Council to select products, services or processes that require certification, and designates those products, services or processes based on their advice.

(6) An exporter applies for approval for export of designated products to a certification body accredited by SIC.

(7) The accredited certification body undergoes an audit by a registered auditor using audit methods established by SIC based on the advice of the Export Certification System Advisory Council. The audit determines whether the necessary products, services or processes meet independently established standards, and if so, the applicant is granted certification for export of the product.

(8) If the exporter has been requested by the (overseas) importing agent to obtain certification of quality system, the exporter may apply to the certification body for permission to certify the quality system.

(9) When the application in (8) is received, the quality system in the applicant factory is audited by a registered auditor using audit methods established by SIC based on the advice of the Export Certification System Advisory Council. The audit determines whether the quality system meets independently established standards or criteria, and if so, the applicant is granted certification for the quality system.

(10) When certification is obtained as described in (7), the appropriate certification mark is affixed to the product (by procedures to be established by SIC based on the advice of the Council), and the product may be exported.

(11) If a certification body does not have the necessary testing and inspection equipment to certify the product under the terms of (7) or to

certify quality system under the terms of (9), these functions must be performed by an accredited testing and inspection organization.

(12) The exporter making application as described in (6) or (8) must pay a separately established application fee to the certification body.

2) Governmental Authority

The governmental authority with jurisdiction over the system is SIC. SIC has the basic framework and responsibility for and ultimate authority over the operation of the export certification system, and will administer the system, but will rely on the Export Certification System Advisory Council (described below) for advice on major issues. For example, SIC has authority to accredit certification bodies, but the actual accreditation will be made by the Export Certification System Advisory Council based on its own accreditation criteria. Also, the actual work of certifying products for export is performed by SIC-accredited certification bodies, but SIC will assure that export certification is done correctly by making on-site investigations at any time.

3) The Export Certification System Advisory Council

The Export Certification System Advisory Council (hereafter referred to the Council) will report to SIC on important matters concerning export certification. The Council will establish criteria for accrediting certification bodies (who will perform the actual work of certification), perform audits of organizations that have applied to SIC for accreditation for certification bodies and report the audit results to SIC. The Council will also perform follow-up audits of accredited certification bodies.

The Council discusses any other matters of importance to the operation of the certification system such as determining the specific items and processes to be certified in relation to a particular product, service and process.

4) Certification Bodies

After being audited by the Export Certification System Advisory Council, and accredited by SIC, certification bodies may accept applications from exporters and other entities, and approve these after the necessary inspections and audits. Certifications could be of three types, product certification, service certification, and factory quality system certification.

5) Qualification of Factory Assessors and Registration

Because of the importance of the work of factory assessment, there must be a special status established for individuals performing this work. Factory assessors therefore must be certified under a Quality System Certification System. It is preferable for the certification bodies described in (3) to directly employ at least a certain number of qualified factory assessors, but there should be no obstacle to using the services of other qualified factory assessors who are independent contractors or belong to other organizations.

6) Accredited Testing Laboratories

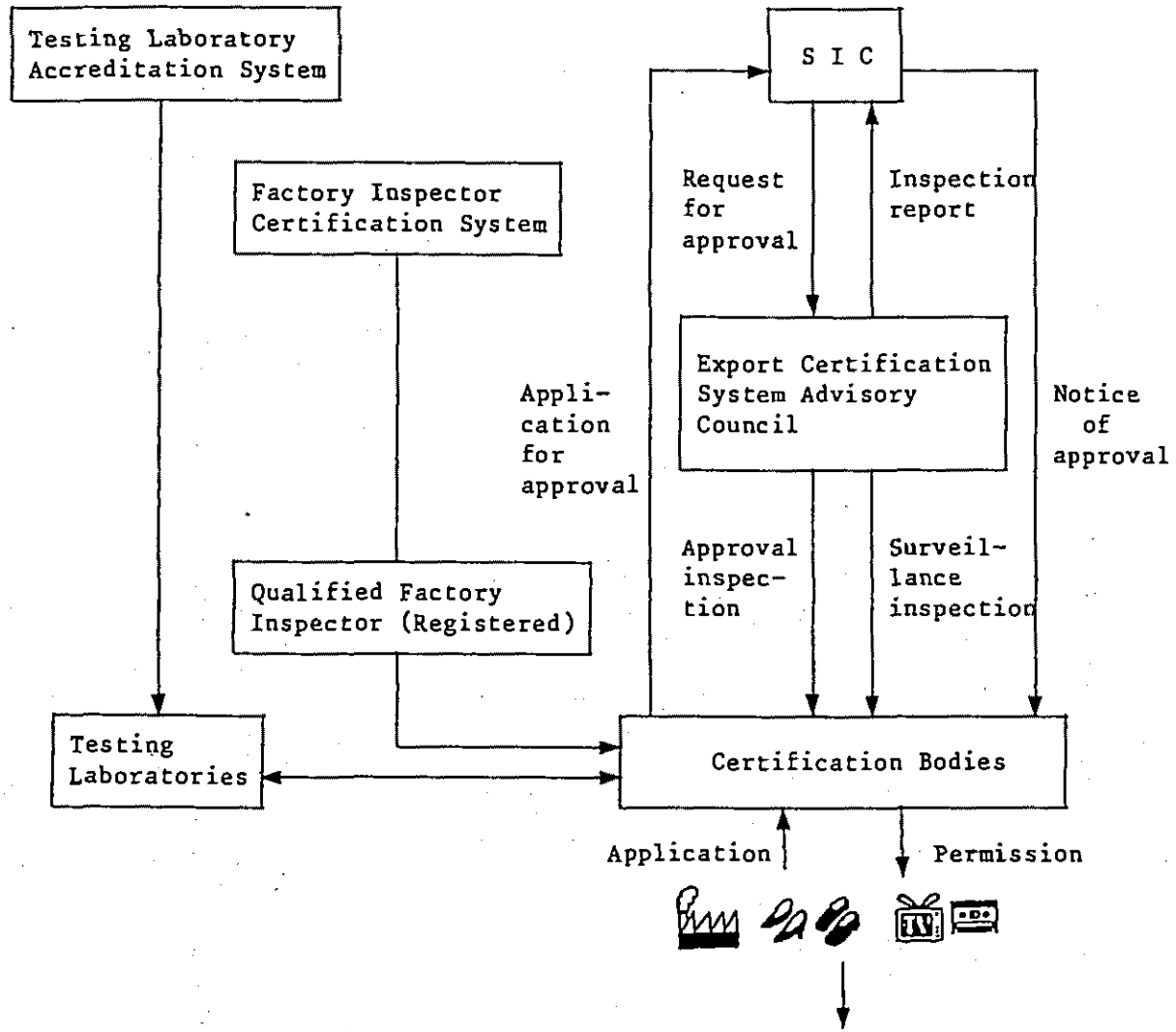
Testing facilities is an indispensible part of the certification process, and to assure reliability, they must meet specific requirements. A system of accrediting testing laboratories must be established.

7) Exporters, etc.

Exporters and similar parties who have received permission under the above procedures may affix the mark of certification and receive permission to release shipments for export.

The above procedures are summarized in the diagram shown in Fig. 3.

Fig. 3 The Export Certification System



(SIC)

(1) Domestic and international promotion of the certifiation system
(2) Mutual recognition of certification systems with other countries
(3) Legal provisions
(4) Design and promotion of logo

(Advisory Council)

(1) Establish criteria for accreditation of certification bodies
(2) Conduct approval inspection of certification bodies
(3) Select products in response to international market demands for designation
(4) Conduct surveillance inspection, etc.

(Certification Bodies)

(1) Certify products
(2) Certify services
(3) Certify factory quality systems

(6) Designation of Products Subject to Certification

It is not necessarily advantageous to certify all products for export. To do so would require widespread establishment of standards, and expanded audit and investigative powers of certifying organizations. The necessary testing facilities alone would demand significant expense and drain on human resources, and centralized operation of such a system would be infeasible.

It is recommendable that product subject to certification be selected based on the following considerations:

[Guidelines for Selection of Products Subject to Certification]

1) Products with substantial present export value, but subject to frequent claims from receiving countries.

2) Products that had significant export value on the past, but have been reduced or eliminated from export because of quality.

3) Products of industries whose export expansion is important to the development of the economy of Argentina.

4) Products having the possibility of significant export expansion due to favorable supply factors (inexpensive materials, availability of skilled labor, etc.).

5) Products requiring standards in order to protect the health or safety of users, or to prevent environmental damage.

For the product certification system to be effective, it is essential to have the understanding and cooperation of all parties concerned. The Export Certification System Advisory Council must establish and publicize guidelines

for the selection of products for certification, and work to gain the understanding and cooperation of the industries (including exporters) related to each individual product selected. A one-sided enforcement of the system can only cause confusion in the related industries, and become a cause of its own downfall.

(7) Conditions for Certification Bodies

Establishment of common conditions for certification bodies is essential to the reliability of a national export certification system, and to the efficient promotion of exports. In establishing conditions for the accreditation of certification bodies, it may be advisable that these be based on the standards and guidelines of international organizations such as ISO / IEC. This will allow Argentina's certification system to develop to international levels.

The following ISO / IEC publications may be used as guidelines for the establishment of accreditation criteria for certification bodies.

(a) ISO / IEC Guide 27: Guidelines for Corrective Action to be taken by a Certification Body in the Event of Misuse of its Mark of Conformity

(b) ISO / IEC Guide 28: General Rules for a Model Third-Party Certification System for Products

(c) ISO / IEC Guide 40: General Requirements for the Acceptance of Certification Bodies

(d) ISO / IEC Guide 56: An Approach to the Review by a Certification Body of its own Internal Quality System

[Criteria for Accreditation of Certification Bodies]

1) Scope of Application

A certification body is a body that conducts certification of conformity. A certification body may operate its own testing and inspection activities or oversee these activities carried out on its behalf by other bodies (as defined in ISO / IEC Guide 2).

2) The following mattes should be determined in details.

(1) General requirements
(2) Administrative structure
(3) Terms of reference of the governing board
(4) Organizational structure
(5) Staff instruction
(6) Documentation and change control
(7) Record
(8) Testing and inspection facilities required by the certification body
(9) Confidentiality
(10) Publications
(11) Appeals

Guide 40 is a basic and general document. While it can serve as a basic guideline for the accreditation of certification bodies, it leaves many issues to be determined according to the circumstances of each particular country. Therefore, serious study by related parties will be needed to agree on details for its application in Argentina. Essential requirements for certification bodies include:

(a) Preservation of fairness and neutrality
(b) Stable financial foundation
(c) Sufficient technical and managerial capability to ensure reliability of certification decisions
(d) Solid organization

Also, although not directly related to criteria for accreditation of certification bodies, it is necessary to periodically verify that they are properly conducting certification activities through.

(a) Setting conditions regulating the length of time between receipt of an application and issuance of certification (to eliminate certification delays).

(b) Presentation to SIC of the internal rules of the certification body for relating to its certification

(c) Annual planning reports to SIC (including operating budgets)

(d) Annual certification activity reports of the previous year to SIC (including financial reports)

(e) Presentation to SIC of a roster of qualified assessors and inspection personnel either employed directly or available on contract.

Further, it is important that internal evaluations be made by the certification body itself, and corrective actions should be taken, if necessary. The results of internal evaluation and corrective actions taken should also be reported to SIC.

(8) Conditions for Inspection Bodies

In the same manner, inspection bodies should be subject to established accreditation criteria. ISO / IEC Guide 39: General requirements for the acceptance of inspection bodies, may be useful for establishing these criteria.

[Criteria for Accreditation of Inspection Bodies]

1) Scope of application should be inspection organizations as described in ISO / IEC Guide 39.

2) The following matters should be determined in details. Guide 39.

   (1) Organization
   (2) Staffing
   (3) Recognition and financial stability
   (4) Communication capability
   (5) Record keeping
   (6) Reporting
   (7) Confidentiality and security
   (8) Facilities
   (9) Other conditions

These matters can be determined in line with ISO / IEC Guide 39. However, this Guide gives basic and general concept, frequently using imprecise expressions such as suitable levels of performance and staffing. For actual use, it is therefore necessary to establish specific guidelines for each country. In Argentina, a special committee should be established within the Export Certification System Advisory Council to seriously examine the establishment of specific requirements. It will be essential to establish separate requirements for inspection bodies for each type of product to be certified.

It would be worth mentioning that the relevant Minister establishes detailed criteria for the designation of inspection agencies. Space limitations prohibit listing here, but the conditions and criteria for organizations inspecting each of the categories of goods subject to certification are indicated concretely. Because the ISO / IEC guides are general and basic, Argentina should use these as a basis for developing detailed accreditation

criteria for organizations inspecting each of the categories of goods subject to export certification. Such details should address especially:

(a) Neutrality and fairness in inspection
(b) Financial stability
(c) Organizational capabilities (technical and managerial capabilities)
(d) Testing and inspection equipment

(9) Conditions for Testing Laboratories

The reliability of test results affects the very essence of a system of product certification. Therefore it is essential that the testing laboratories engaged in an export product certification system meet certain conditions established by the testing laboratory accreditation system, that is scheduled to be independently established. However, if the testing laboratory accreditation system is not established soon, and a certification body is therefore forced to use outside testing laboratories, testing must be conducted at testing laboratories meeting the following conditions.

In addition, the following ISO / IEC Guides relate to testing laboratories.

(a) ISO / IEC Guide 25: General Requirements for the Technical Competence of Testing Laboratories
(b) ISO / IEC Guide 38: General Requirement for the Acceptance of Testing Laboratories
(c) ISO / IEC Guide 43: Development and Operation of Laboratory Proficiency Testing
(d) ISO / IEC Guide 45: Guidelines for the Presentation of Test Results
(e) ISO / IEC Guide 49: Guidelines for Development of Quality Manuals for a Testing Laboratory
(f) ISO / IEC Guide 54: Testing Laboratory Accreditation Systems - General Recommendations for the Acceptance

of Accreditation Bodies

(g) ISO / IEC Guide 55: Testing Laboratory Accreditation Systems - General Recommendation for Operation

[Criteria for Accreditation (or Approval) of Testing Laboratories]

1) Scope of Application

Limited to test as described in ISO Guide 2.

2) It is recommendable that the following matters be established concretely. ISO / IEC Guide 38 would be useful.

(1) Organization
(2) Staff
(3) Assessment of competence (Including ISO / IEC Guide 25)
(4) Other requirements
(5) Notification of changes

ISO / IEC Guide 38 uses very general language, leaving substantial room for the testing laboratory accreditation bodies in each country to establish requirements based on local conditions. Thus it is hoped that the groups supporting the Product and Service Quality Committee established in Argentina in March 1989 will become active in the early establishment of a testing laboratory accreditation system that meets the requirements of Argentina and is consistent with international practices. In such a system, (1) Operation of the accreditation system that accredits testing laboratory is desirable to be based on ISO / IEC Guides 54 and 55, and (2) Basic conditions for testing laboratories that will be accredited is preferable to be in accordance with ISO / IEC Guides 25 and 38.

(10) Outline of quality System Assessment (Assessment Items and Assessment Criteria)

An assessment of factory quality system should address the following issues.

(a) Management responsibility
  A. Quality policy
  B. Organization
  C. Management review
(b) The quality system
(c) Review of contracts (if there are contracts)
(d) Design control
  B. Design and development planning
  C. Input to design
  D. Output from design
  E. Design verification
  F. Design changes
(e) Document control
  A. Approval and issue of documents
  B. Document changes and modification
(f) Purchasing
  A. General
  B. Evaluation of subcontractors
  C. Purchasing data
  D. Verification of purchased goods
(g) Purchaser supplied products
(h) Product identification and traceability (if appropriate)
(i) Process control
  A. General
  B. Special processes
(j) Inspection and testing
  A. Receiving inspection and testing
  B. In-process inspection and testing
  C. Final inspection and testing
  D. Test and inspection records
(k) Inspection, measurement and testing equipment
(l) Inspection and test status

(m) Control of nonconforming product

A. Nonconformity review and disposition

(n) Corrective action

(o) Handling, storage, packaging and delivery

A. General

B. Handling

C. Storage

D. Packaging

E. Delivery

(p) Quality records

(q) Internal quality audits

(r) Education and training

(s) Servicing

(t) Statistical techniques (if appropriate)

(11) Requirements for Quality System Assessors

The success or failure of quality system certification depends to a very great extent on the assessors conducting the factory assessments. Therefore, certification bodies desiring to be approved as authorized certification bodies relating to export certification system should be given the obligation to have a certain number of quality system assessors (qualified assessors) who meet certain qualifications and are registered with SIC. (If assesssment is entrusted to other organizations, these should likewise be required to have a certain number of qualified assessors registered with SIC.) The indispensable qualifications for assessors are sufficient knowledge and experience in the field in which they conduct assessment. Educational background, field of specialization, years of experience and level of study completed are normally considered the basis for qualification. Education, experience and study are normally considered complementary, so that a high school graduate would require more experience or study than a university graduate to qualify for certification. The general qualifications are as follows.

1) Education level

Should have completed at least middle school. Also, must have the ability to communicate ideas and concepts clearly.

2) Training

Sufficient training is required to assimilate the necessary technical understanding to effectively assess quality systems. The following fields are especially important:

(a) Knowledge and understanding of the standards related to assessment of quality systems.
(b) Assessment skills such as surveying, questioning, evaluation and reporting.
(c) Skills related to managing assessment, such as planning, organizational structure, disseminating information, and giving direction.

When training is completed, a written or oral test must be given to verify that students have attained the desired level of capability.

3) Experience

In addition to training in the fields of science, technology, engineering, manufacturing, construction, maintenance, service, management or economics, applicants should have at least 4 years of practical on-site experience. Of the 4 years, it is essential that at least 2 years be in the area of quality assurance. Also, they should have had the experience of participating in at least 4 quality system assessments. In addition, they should also have had at least 20 days' experience in document review, on-site assessment activities, and report writing.

(12) Qualification, Location, and Registration of Inspectors

Inspectors with the proper education and experience are essential to the operation of an effective product certification system. Qualifications for inspectors are described in ISO / IEC Guide 25: General Requirements for the Technical Competence of Testing Laboratories, and Guide 39: General Requirements for the Acceptance of Inspection Bodies. The former pertains to testing, and the latter to inspection. According to Guide 39, Inspectors should have:

(a) Training in theory and practice of quality assurance.

(b) If giving advice on the approval of certification upon manufacturers quality assurance systems, (1) qualified in appropriate disciplines, and (2) at least two years practical experience in quality assurance, inspection technology, and production methods. (3) Persons monitoring manufacturers quality control systems after approval of certification should also meet the qualifications in (2). Qualifications for testing personnel require the necessary education, training, technical knowledge and experience in the relevant field.

In any case, the guidelines presented in the ISO / IEC guides are general descriptions, and more specific qualifications must be developed in accordance with the situation in Argentina.

The number of qualified inspectors to be available to accredited inspection bodies (or by any separate inspection bodies to whom inspections are entrusted) must be sufficient to allow efficient operation of the business of export certification. There are no international rules governing the minimum number of qualified inspectors, and this must be determined separately for each certification (or inspection) body in

Argentina. This number should be set as one of the conditions of accreditation of an inspection body, and increased proportionately as the volume of work increases. Names of qualified inspectors should be registered with SIC.

(13) Certification Marks and Certificates of Conformity

The creation and display of certification marks and certificates of conformity is probably best based on the ISO / IEC Guide 23, Methods of Indicating Conformity with Standards for Third-Party Certifications.

(14) Certification Fees

It goes without saying that the business of inspection and testing for certification involves costs. In addition to the direct costs related to the work itself, the indirect costs of supporting the necessary organization must be borne proportionately as well. In order to maintain a financially sound certification system, these direct and indirect costs must be covered in total by certification fees. In principle, certification costs should be covered by those who benefit from the certification, namely the applicants.

As described in ISO / IEC Guide 28, General Rules for a Model Third-Party Certification System for Products, certification costs should be separately established for each different certification program. However, this should not result in excessive burdens on exporters and other applicants, so that it is better to set maximum limits, and allow each certification body to establish its own fee scale within these limits. Maximum fees should be set by the Export Certification System Advisory Council after due study of the effect on all concerned parties. In order to prevent the maximum from being too high, the government should promote policies aimed at keeping costs low, such as encouraging the use of the

minimum necessary inspection standards and testing equipment that do not require expensive testing. For reference, the maximum fee for export inspection in Japan is limited to 1% of the export value of goods, even for multiple inspection items. Actual fees, however, are more likely to be in the range of 0.3%.

(15) Conditions for Exceptional Cases of Application for Product Certification

Product certification procedures need not be identical for all designated products. In certain cases, such as those listed below, it may be advisable to grant exemptions from the certification system and suspend some of the procedures.

1) Exemption from Requirements

(1) Cases where it is recognized by the Export Certification System Advisory Council, and approved by SIC, that the export of specified goods will not damage the reputation of national exports.

(2) Goods exported for the use of the Embassy or other government entities.

(3) Export of personal items for the private use of the purchaser, or for household or professional use.

(4) Export of items not requiring foreign exchange, such as
- Relief supplies
- Commercial samples
- Items for display in trade fairs or exhibitions

(5) Export of small quantities, where it is recognized by the Export Certification System

Advisory Council, and approved by SIC, that the small quantity to be exported will not damage the reputation of national exports.

(6) Export of items for consignment manufacturing for further processing in foreign countries.

2) Exceptional Treatment

Exceptional treatment is granted in cases where it is recognized by the Export Certification System Advisory Council, and approved by SIC, that the manufacturer is able to improve and maintain product quality (including packaging), even though the product is not certified through third-party inspection.

It is preferable for such manufacturers to display or affix an indication of manufacturers' declaration of conformity. For guidelines, see ISO / IEC Guide 22, Information on Manufacturer's Declaration of Conformity with Standards or Other Technical Specifications. However, it is essential that SIC and the Export Certification System Advisory Council continue to make on-site factory inspections and observe manufacturing conditions as appropriate, and revoke permission for exceptional treatment if violations are observed.

CHAPTER 5 - SUMMARY AND CONCLUSION

5.1 Policies Required for Government and Industries to Promote Exports

In order to overcome the economical crisis Argentina now faces, it is needless to say that the Menem administration should first of all stop inflation, stabilize the exchange rate, and improve productivity. One of the important policies needed to achieve this goal, as most people point out, is the necessity to increase their foreign exchange reserve under stable conditions by means of exporting their products. To actually promote exports from the country, it is necessary to improve organizations for quality control in each industry and to enhance competitiveness in international markets by improved quality control, as described in Part 2 of both the intermediate and final reports for this survey. Also establishment of a nationwide certification system as well as standardization and diffusion of the industrial standards are indispensable as described in Part 3. Much time and money are required, however, until these policies bear actual results. For this reason, of the various environmental elements surrounding the car industry in Argentina described in Part 1, we will explain only the several policies which would immediately bring out results for promotion of exports, if they are actually carried out.

First of all, the following measures banned in relation to the Economic Emergency Law 1989 should be resumed.

(1) Export tax exemption program for industrial products
(2) Export drawback (Reembolso) system
(3) Various incentives based on the Industry Promotion Law

It is doubtless that these measures would be useful for improvement of the exporter's profit, which aggravated extremely at the moment and would strengthen their willingness to export industrial products.

Secondly, in order to modernize production facilities in the country, it is necessary to introduce a policy similar to the scrap-and-build policy (Refer to Okita Report), and to introduce import tax exemptions for particularly important types of production machinery. These measures would, if carried out, not only give stimulus to renewal of production facilities, but also induce technological progress among facilities and machine manufacturers.

People in various industries in the country should wrestle with the following two problems.

First, in the industries which can be categorized as material industries, it is desired to improve and stabilize the quality of material by means of quality control, management control, and increased productivity. Ideally as a result of the above efforts, the price of industrial materials will become cheaper. In other words, they should recognize that efforts towards improvement of company management in the material industry would make cars produced in the country and auto parts industry itself more competitive in the international market. This is also true in the third industry or service industry which seems, at a first glance, quite different from the manufacturing industry. Improvement of quality and productivity in the fields of packing and transportation as well as communications and financial services for the manufacturing industry will directly result in higher competitiveness in the international market. For this reason, it is quite essential for the industry to establish close mutual relations for a greater chance of better communications and exchange of information.

Secondly, each industry should take into full consideration the effective use of FOPEX which has been reserved as a private fund for the promotion of exports. At present, utilization of FOPEX is considered only from the viewpoint of exporters, and it seems that the fund is directly allocated among them for use. Another point of view for application of this fund is required. For instance, it may be good to give

benefits to partner countries for their import. For example, how about inviting missions for the purpose of purchasing Argentine products from such partner countries in Central and South America and giving them chances to inspect quality control in factories in Argentina so that they can recognize the quality of industrial products in Argentina. Also the exchange of opinions on technical issues, or having business talks with representatives from industries in Argentina are possible ideas by using the fund to cover the expenses. If there are problems which give negative effects for promotion of exports from Argentina, the fund might also be used to solve these problems. Thus, the fund should be used to assist importers and exporters more flexibly.

Note that for this type of subsidy or assistance money, it is necessary to publicize, taking the earliest opportunity the contents of its balance and concrete purposes for expenditure in as much detail as possible every year for effective and fair use or allocation.

5.2 Policies to be Introduced by Auto-parts Association (CIFARA etc.) for Promotion of Exports

Prerequisites for the promotion of exports of auto parts produced in Argentina are, of course, higher competitiveness on the part of each auto parts manufacturer (in terms of product quality, price, and delivery) and business strategy, which should be well considered for promotion of exports. These goals can not be achieved, however, by a single company. And the efforts required by the government and industries in the country towards achievement of these goals are described in Paragraph 1. Paragraph 2 describes the policies which auto-parts association (CIFARA etc.) should introduce and follow for promotion of auto part exports from the country. Auto-parts association (CIFARA etc.) was established for the purpose to improve or innovate the car parts industry in Argentina, and now about 800 member companies belong to any of the 4 associations. The purpose of auto-parts associations

(CIFARA etc.) is to search for the general interests common to the member companies. For this reason, the organization should make more active efforts for the promotion of auto part exports because it is a common hope for all auto parts manufacturers in the country. The most urgent problems now facing auto parts manufacturers in the country, which have to be solved, are largely classified by those related to the marketing capability required for promotion of exports and those related to improvements in quality control. These problems can hardly be solved by a single company, and auto-parts association (CIFARA etc.) assistance is most required in these fields.

(1) Assistance for strengthening marketing capability

Extensive exchanges with related organizations and institutions and the collection and accumulation of information.

- Exchanges with ADEFA
- Exchanges with the material industry (including companies engaged in procurement of raw materials) in Argentina
- Exchanges with overseas auto parts manufacturers
  - . Exchange of information on patents and new products (exchange of house organs and other technical documents)
  - . Promotion of technical cooperation (dispatch and acceptance of missions)
  - . Promotion of and mediation for business transactions (dispatch and acceptance of missions)
- Survey of trends in foreign markets
  - . Exchanges with foreign car manufacturers (industrial organizations related to car production)
  - . Dispatch of missions and request to member companies to participate in the missions
  - . Opening show rooms in each major country

(2) Improvement of quality control activities

- Improvement in understanding about the necessity of quality control
  - Company managers, middle class managers, people related to sales activities, production engineers, quality control engineers, and all employees
- Improvement in quality control techniques
  - Distribution of the quality control program introduced in this report
  - Implementation and administration of the technological exchange program recommended in this report
- Exchange with engineers of ADEFA

5.3 Summary on the Technological Exchange Project

This survey was carried out to establish and introduce quality control and certification programs for industrial products for exports produced by medium and small companies in Argentina. More concretely, this survey was carried out to establish a quality control system for auto parts (including mechanical and electromechanical parts as well as a program for its distribution. Furthermore this was done to establish an export certification system for general industrial products produced in the country and a program for its implementation.

Additionally, to increase exports from the country, it is necessary to examine and solve many problems related to export duties, finance, communication, and transportation from a national point of view. Also it is indispensable for each company to conduct active sales and marketing activities including market research. In this report, results of our survey are introduced in relation to the improvement of quality control activities and the establishment of an export certification system.

To increase exports of industrial products produced in Argentina, it is necessary as a prerequisite to establish a

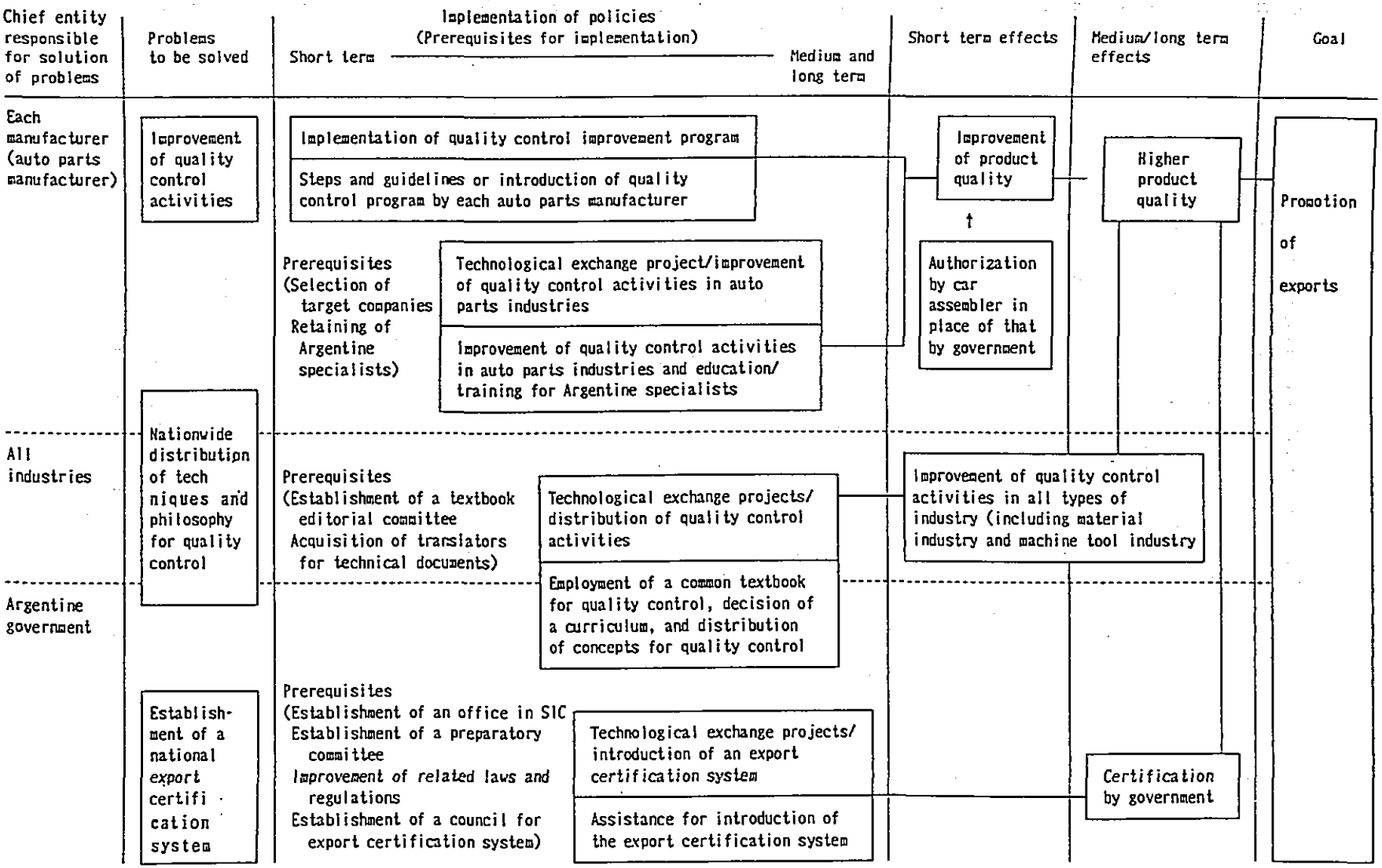
national certification system and distribute quality control techniques and philosophy in order to insure the product quality required for introduction of the certification system. For this reason, the most important objective for them is establishment of a infrastructure for the industrial development of the country. To realize this, however, much time and money are required. To actually improve the present Argentine economy even partially which is now facing a serious crisis, it is practical to pick up several industries having relatively high potential in order to increase exports and put a priority on their improvement for making a breakthrough from the current crisis. In the preliminary survey carried out before this one (in March, 1989, with Kazuo Ishii as director), the mechanical and electromechanical automotive parts manufacturing industry were selected from this point of view, and a program for their improvement and a program for technological exchange were recommended. In this report, we propose the ways to improve these industries and recommend several ideas for nationwide distribution of the quality control technology as well as its philosophy and introduction of an export certification system.

The relation between the three technological exchange projects introduced in Parts 2 and 3 of this report and the "quality control improvement program" prepared especially for auto parts manufacturers is shown in Figure iv-1.

First Step

Each auto parts manufacturer, under a company-wide resolution including the top management, carries out quality control activities referring to the quality control improvement program and the examples introduced in this report. At the same time, activities for technological exchange with advanced countries in terms of quality control are carried out especially by SIC and auto-parts association (CIFARA etc.) to achieve goals related to quality control and set for the Argentine auto parts industry as a whole. The auto parts industries in Argentina has always exported their

Figure iv-1 Relations between Recommended Technological Exchange Projects



products more than other smaller industries in the country, and their standard in terms of product quality is higher than that in other industries. Also, as auto parts are concerned, a national quality assurance system is not always required, because certification provided by car assemblers which are international enterprises can play the part. Objectives of the efforts made in this first step are limited to improvement of quality control activities in the auto parts industry, selected out of several industries and promotion of export of their products, but immediate effects can be expected.

Second Step

In order to distribute techniques and ideas for quality control of the entire industrial world in Argentina, coordinated efforts by the Government and industries are required. In this report, we recommended various activities required for achieving this goal, including the decision on a common textbook which can be used throughout Argentina, preparation of a curriculum, and seminars designed for various levels of related people. To carry out this project, it is necessary to establish a textbook editorial committee consisting of a specialist in both public and private sectors to run the committee effectively. For reasons described above, the timing to start the second step is later than the first step, but it is more realistic to wait until the prerequisite conditions are satisfied.

If activities designed for the first and second steps are carried out effectively, the general quality level of Argentine industrial products would be raised, export of their industrial products would increase, quality of materials and machine tools produced and used by the auto parts industries would become higher, which would result in additional improvement of industrial product quality in Argentina.

Third Step

Establishment and introduction of an export certification system are the most urgent objectives for promotion of exports of industrial products produced in Argentina. To realize this system in the country, however, many problems must be solved beforehand (as described in detail in Chapter 4, Part 3 of this report). Note that the 3 projects introduced in this report are recommended as important and necessary ones for promotion of industrial products produced in Argentina, and that it is important to clear the prerequisites for each project. It is needless to say that, if possible, these three projects should be carried out simultaneously, and they should not wait until all prerequisites for all three projects are satisfied. They should start any project when the prerequisites for that particular project are satisfied. Even if each project is carried out independently, the effects, as described above, would be achieved.

5.4 Problems to be Solved

To effectively carry out the three technological exchange projects described above and to get substantial results, several problems must be solved in Argentina. This section describes these objectives. We hope quick responses from the Argentine side to achieve the goals clarified in this survey may be realized as soon as possible.

(1) Objectives for Promotion of Auto Parts Exports

1) Survey on overseas customers and markets

Target for survey	Survey items
- Auto manufacturers and industrial organizations related to auto production in and out of Argentina:	Production plan by car type, number of cars by car type etc.
- Networked service shops in and out of Argentina:	Entire industry, conditions for inquiry etc.
- Material producers:	Overseas environment, business customs including laws and regulations
- Embassies in foreign countries:	General foreign environment
- Organization related to auto parts industry in foreign countries:	General conditions of auto parts industry, and conditions required for coexistence with them
- Auto parts manufacturers in foreign countries:	Auto parts industries and conditions required for coopertation with them

2) Selection of customers and market

- Auto assemblers/knock-down factories/networked service shops in foreign countries

3) Activities for improvement of quality control in each company promoted by such organizations as auto-parts association (CIFARA etc.)

- Innovation of management's and company-wide consciousness for quality control activities
- Implementation of quality control improvement program

- Effective utilization of technological exchange projects (for improvement of quality control activities)
  - Improvement of quality control activities in parts manufacturers
  - Activities by Argentine specialists educated and trained in the field of quality control

(2) Objectives for nationwide distribution of quality control activities

1) Activation of educational functions

- Education and training of quality control
- Symposium on quality control
- Survey and research of quality control
- Publication and sales of books and journals on quality control
- Participation in international quality control activities

2) Preparation of standard textbooks

Preparation of textbooks for each layer

- Guidebooks for management, quality control engineers, shop leaders, and QC circles

3) Close cooperation between certification office and organizations for diffusion

- Preparation of in-house standard manual, and technical documents related to quality control system and industrial standards
- Realization of closer relationships between local branches of each institution or organization

4) Realization of quicker services in test or inspection facilities

- Quicker services related to tests, check, calibration, and technical guidance requested by private companies

5) Technological exchange with foreign countries

- Introduction of Argentine industrial standard to foreign countries
- Participation in international events

(3) Objectives related to introduction of an export certification system

1) Improvement of laws and regulations related to the export certification system

- Purpose and definition of export certification, examination of quality control system in each factory, test and inspection, certification office, inspectors in each plant, test facilities etc.

2) Improvement of organization in an operating office

An office responsible for introduction of the export certification system should be established in the Ministry of Economy

- Implementation of laws and regulations
- Promotion of mutual certification system with foreign countries and introduction of Argentine certification system to foreign countries
- Configuration (9 persons including section managers)

3) Establishment of the Export Certification System Advisory Council

The Export Certification System Advisory Council should be established to examine the export

certification system and make proper recommendations upon a request from the Ministry of Economy

- Representatives from federal government, major manufacturing industries, academic circles, organizations related to certification and test, and organizations for diffusion of quality control and educational services for its promotion.
- Subcommittees should be set up for full investigation of objectives in each field. Such subcommittees include general assembly, standard coordinating committee, product certification committee, quality control system committee, and other subcommittees for each industrial field.

JICA