

### (3) Reinforcement of autonomous merchandising

Generally speaking, the value of a consumer product may be classified into physical value, as represented by quality and function, and sensual value, as represented by image and design. A product's value may differ from one country to another by virtue of the economic strength or social conditions of each country. In general however, physical value is given more weight in developing countries while sensual value is given more weight in advanced countries.

Let us take automobiles for example. More than 10 million automobiles are sold in Japan every year. According to a survey conducted by the Association of Automobile Manufacturers in Japan, the top ranking factor motivating the decision to purchase an automobile is design. Of course factors such as engine performance and fuel consumption are not ignored. However, few practical differences exist between automobile models manufactured by different manufacturers, except for specialty cars such as sports cars, so comparisons between automobile designs greatly affect volume of sales.

Design now ranks first among motivations to purchase even such practical merchandise as an automobile. In advanced countries, hardly any garment purchase is decided only on the basis of physical value. The situation is much the same in Uruguay where higher class consumers place more weight on garment brand and design.

The Uruguayan garment industry has so far produced garments in accordance with the specifications of overseas buyers. However, the industry is now urged to establish its own merchandising, in other words to develop a high value added line of products as it loses its price competitive edge. This is what is called "autonomous merchandising"; the industry must now restructure itself to systematically conduct autonomous merchandising.

To begin with, trends in export markets must be fully comprehended. Establishment of marketing activities is the first step in autonomous merchandising, to be followed by the reinforcement of merchandising activities. The development of competent merchandising specialists is indispensable for the reinforcement of merchandising.

Merchandising specialists are the most important staff in controlling the success or failure of product planning. They have to understand market trends accurately and prepare product plans including materials to be used, designs, quality and cost. In addition to merchandising specialists, designers and patterners must be nurtured. Designers develop designs in line with the product plans prepared by merchandisers and patterners develop industrial patterns in line with the designs developed by designers.

Of course, autonomous merchandising is riskier than subcontracted export. However, it has to be remembered that the Uruguayan garment industry is no longer able to indulge itself in subcontracted export as it loses its price competitive edge. Furthermore, the Uruguayan garment industry is now obliged to establish its own autonomous merchandising system as soon as possible in order to survive and develop itself into an industry capable of exporting to advanced countries in Europe and North America.

#### 2-5-2 Cost reduction

Means of cost reduction may be classified into those applying to external factors including taxes and public service charges, and internal factors particular to the industry. Important internal factors are material cost, labor cost and auxiliary material cost. The following actions which ought to ensure successful cost reduction if implemented properly is recommended.

(1) Promotion and implementation of cooperative work

The promotion of cooperative work within by the industry shall be discussed again later. CIV and PIU must take the initiative in promoting cooperation between member enterprises in joint purchase of materials and auxiliary materials in order to bargain for quantity discounts and to save time and expense on the part of individual enterprises. The same applies to joint purchase of high technology production machines and joint storage and distribution of materials and auxiliary materials to reduce cost of facilities and plant operation for individual companies. Joint use of sponging facilities or stone washing plants which would operate at a low rate of utilization when owned and operated by a single company could save plant capital and operation costs.

Location of production facilities for export garments within the free zone to be established in Montevideo would result in cost reductions proportional to the tax incentives involved.

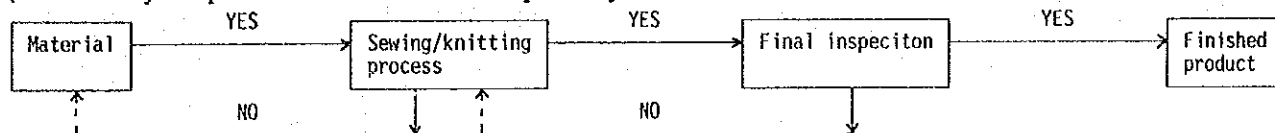
(2) Implementation of effective quality control program

Most Uruguayan garment manufacturing enterprises do not have a proper quality control program. A effective quality control program, if implemented properly, would ensure elimination of waste and would contribute to achieving cost reduction and quality improvement.

For example, many manufacturers inspect products during the finishing process only without inspecting semi-finished products during intermediate phases. Products rejected in the finishing process represent a waste of material, labor and energy. They may be sold as defective products at discount stores.

Inspection at the end of each intermediate process would make it possible to return the rejected items to the previous process for rework. Step by step production would reduce the occurrence of defects and would lead to cost reduction. Fig. III-2-3 graphically contrasts the method of quality control currently in use with the more effective method that ought to be implemented.

(Currently implemented method of quality control)



(More effective method of quality control)

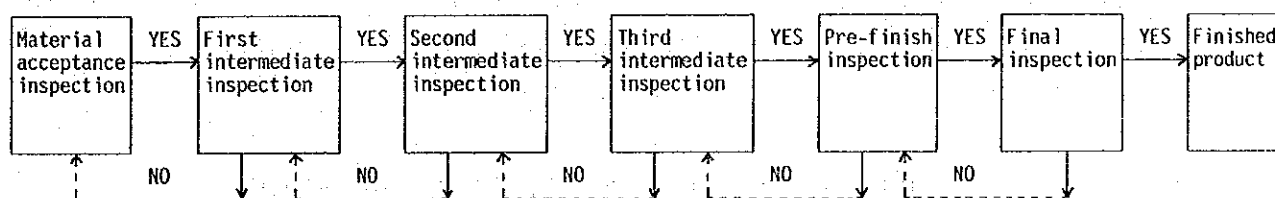


Fig. III-2-3 More effective method of quality control for implementation

The system above, intended to eliminate defective products, must be adopted and thoroughly implemented by each company in order to establish effective quality control. (The number of intermediate inspections carried out may vary from one type of product to another.) Industry associations ought to lead member enterprises to implement this effective method of quality control under their own initiative.

Details of the quality control program applicable to garment production and the inspections that ought to be implemented are discussed in Chapter 3.

### (3) Utilization of free zones

Free zones are for utilization by export oriented enterprises. The part of CIV, PIU and individual companies desire the reduction of Uruguayan tax rates to a level

comparable to the tax rates applied in the three other MERCOSUR member countries.

1) Advantages of free zones

As mentioned in Part I, enterprises which operate within a free zone will be exempted from corporate tax, wealth tax, consumption tax and import duties, and are entitled to apply for special rights under the law concerning the promotion of industry.

Accordingly, taxes from which the enterprises operating within free zones are exempt, in addition to import duties (Part I, 2-4-(1)-1 for the rates of import duties), are shown in Table III-2-3.

Table III-2-3 Taxes from which enterprises operating within free zones are exempt

Item	Rate (%)	Remarks
Corporate tax (Commerce, industry)	30	On the net income of an enterprise
Wealth tax enterprise	2	On total assets of an
Consumption tax	22 - 12	Max. 22% - Min. 12% (Refer to Texto Ordenado/91 DGI)
Commodity tax		Applicable to specific items. (Rate may vary from item to item such as tobacco, alcohol, cosmetics, electrical appliances and so on. Refer to Texto Ordenado/91, DGI.)
Social security charge	22.5	On wages of an employee (Comprising BPS : 16.5%, DDISS : 5%, personal income tax : 1%)

Source : DGI, BPS materials, as of July 1992

As a result of revisions of the applicable laws that came into effect in 1987, the free zones which were formerly no more than bonded warehouse areas became open to production and processing of products for export. The national free zone in Colonia was already occupied by a business manufacturing metal sieves and a small scale enterprise for the assembly of household electrical appliances. The former in particular was found to be very active and tidy. Similarly, the national free zone in Nueva Palmira is already occupied by a manufacturer of tire tubes and it is informed that a building stone company is planning to move in (Directorate of Free Zone, Ministry of Economy and Finance).

It would be worthwhile for the Uruguayan garment industry to study the possibility and advantages of utilizing free zones, in particular for export oriented enterprises.

## 2) Utilization of private sector free zones

The Directorate of Free Zones, Ministry of Economy and Finance is now planning to establish private sector free zones in Montevideo and Fray Bentos. Applications for use of the free zone in Montevideo will be accepted from 1992 onward. CIV, PIU and their member companies ought to study the possibility of individual operations, joint ventures with foreign corporations and joint operations by Uruguayan enterprises in the Montevideo free zone in earnest in preparation for the inauguration of MERCOSUR. The majority of garment manufacturing plants are conveniently located in terms of transportation within the city of Montevideo or in its suburbs.

## (4) Taxes, public service charges

The active cooperation of the Ministry of Industry is desired for reduction of taxes, and public service charges.

## 2-6 Improvement of Management, Development of Human Resources

It is recommended that promotion of cooperative work, development of human resources and reinforcement of the education and training system as effective means of increasing the supply of talented personnel and improving the management of garment industry enterprises.

### 2-6-1 Promotion of cooperative work

Cooperative work is defined such that enterprises and/or stores provide capital funds and operate a business jointly.

#### (1) Need for cooperative work

The promotion of cooperative efforts between Uruguayan enterprises is the single most effective means to achieve the required cost reductions and survival of the industry. Unless the Uruguayan garment industry succeeds in restructuring itself, its future will be rather grim.

For Uruguayan garment manufacturing enterprises which aim to penetrate not only MERCOSUR member countries but also the international market, it is imperative not only that they transform themselves into technologically innovative advanced enterprises, but also that the Uruguayan garment industry as a whole restructures itself into a systematized, information and technology intensive industry.

The recommended reforms will require injection of enormous amounts of capital and a long time to achieve. Very few Uruguayan enterprises are capable of bearing the burden of reform on their own because the number of well-known local designers and brands is extremely limited, there are few state-of-the-art production facilities, and export markets of sufficient magnitude have yet to be established.

CIV and PIU must clearly comprehend the current state of affairs and must lead member companies in the promotion of cooperative work and specialization in every aspect of the garment industry, in order to survive. For example, individual enterprises are not capable of collecting overseas fashion information and market trend information as needed, so the industry associations and government agencies involved must cooperate with and assist private businesses in the collection of such information.

(2) Concrete examples and significance of possible cooperative efforts

1) Joint use of information

By collecting all the information concerning color, pattern, design, raw materials, auxiliary materials, markets, design, raw materials, consuming power and distribution needed by the garment industry and using it jointly, each enterprise will be able to get more affluent information. The cost of organizing the exhibitions, fashion shows and sample shows needed for market development could not possibly be absorbed if organized by individual companies alone. Accordingly, joint organization by enterprises is worthy.

2) Holding of joint fashion shows for order acceptance

Trade associations should take the lead in holding 2 or 3 joint fashion shows every year, in which member companies participate. The potential of the Uruguayan garment industry must be exhibited to the world market more aggressively. Uruguayan embassies and consulates located in various parts of the world may be solicited to provide assistance and cooperation in advertising the Uruguayan garment industry. An exhibit for order acceptance organized on a national scale may be a possibility worth consideration.



### 3) Joint use of high technology production machines

CAD/CAM facilities require an enormous amount of capital investment, while individual businesses may not have a sufficient workload to fully utilize them. Likewise, high technology sewing machines, sponging facilities and stone washing plants for jeans are not easily affordable by individual companies. Unless jointly used, their costs cannot be absorbed.

CAD/CAM and other high technology facilities installed in LATU or UTU and made available to every company would help to reduce individual companies' operating costs.

Furthermore, joint order and procurement of materials and auxiliary materials including lining and buttons would also help to reduce individual companies' costs. Production of diverse varieties in small quantities will require procurement of small lots of diverse varieties and will require joint efforts to eliminate inefficiencies in purchase and preparation.

Joint storage and joint transport (including hanger transport) would also help to reduce costs.

Joint procurement systems must be examined to see if foreign economic aid and lease systems can be used to raise the necessary funds for implementation.

Charges must be collected from companies for the use of such joint facilities and services to repay any loans and to cover the cost of their operation.

### 4) Education and training of operators

It is necessary to ensure that technicians and middle management staff are capable of operating CAD/CAM and high technology sewing machines in order to cope with production

of diverse products in small lots.

Trade associations must play a central role in the education and training of technicians and middle management staff for the operation of CAD/CAM systems and high technology sewing machines. The personnel so educated and trained should be pooled and made available for joint utilization.

- 5) Advantageous utilization of Uruguayan products (in particular wool materials)

Vertically integrated cooperative efforts should be promoted with the traditional Uruguayan wool producing industry and wool textile industry in order to advantageously utilize raw materials to produce high value added products. Value should be augmented by producing washed wool rather than raw wool, then in place of washed wool, tops → yarn → fabrics/knitwear → garments, in order to promote export oriented industries. The accumulated effect of such measures, however small each may be in terms of individual cost reduction, quicker delivery and differentiation of products, will eventually lead the industry to the level of those in advanced countries. An organization of small enterprises can better adapt to the needs of small lot, large variety production lots than a single big enterprise capable of producing everything. "Capable of producing everything" is synonymous with "not capable of producing differentiated products."

All action items that can be implemented must be taken up immediately, one after another. Quick results must not be expected. Emphasis should be placed on reform of the fundamental composition of the industry.

## 2-6-2 Human resource development

Development of talented individuals to staff is important at all times in every respect. On the basis of the background conditions discussed in Part II, and from the perspective of developing more skilled personnel, the following measures for improving management of the Uruguayan garment industry are recommended.

- (1) Standing productivity seminar to be organized under the initiative of trade associations or government agencies

The productivity seminar should be classified into a Part I dealing with analytical, industrial engineering approaches to improved productivity, and a Part II dealing with the structuring of management to utilize the TQC way of thinking. Actual activities should be grouped into the following three curriculums for different groups of participants.

- 1) Course intended for corporate presidents and general managers

Curriculum focused on top management ways of thinking including management concepts, upgrading of productivity and quality control. As mentioned earlier, reform of the consciousness of top management is considered highly important for the Uruguayan garment industry.

- 2) Course intended for division managers, section managers and middle management staff

Curriculum focused on directly managing productivity and quality control within a company, with emphasis on theories and methods of implementing relevant to day-to-day activities.

3) Course intended for core production line leaders

Curriculum focused on where to look for the opportunities to improve productivity and quality in the production line and how to engage in improvement activities that can bear concrete results.

Education and training of employees in general must be studies case by case.

In case no competent lecturer is available in Uruguay, specialists should be invited from abroad. Sponsors do not have to be those suggested by the heading of this section. However, the involvement of trade associations or government agencies would have the side effect of enhancing consciousness of existing problems within those associations and government agencies.

The Ministry of Industry is already in contact with REFA of Germany to organize overall productivity seminars. Although the subject of study is primarily targeted to enhancing efficiency and increasing the productivity of workers, it may aggravate the confrontational antagonism of workers toward management. Simultaneous training of top management and a curriculum that reviews the basic concepts of quality and productivity are very important.

(2) Incentives to encourage acquisition of official credentials by engineers and technicians

The minimum wage set out for sewing machine operators by the guidelines on minimum wage by occupation is not high enough. There exists almost no system of periodic raises or bonuses. In such a social environment, the introduction of a wage system linked to the acquisition of official credentials that provides physical and psychological incentives, together with the establishment of a system of official credentials,

must be considered as a means of building the morale of sewing machine operators. The system must be linked to the educational curriculum of UTU discussed earlier.

The risk of employees job hopping after having acquired official credentials may be undeniable. This is exactly where proper labor management comes into play. The advantages of proficiency and experience gained through long service must be recognized and rewarded by a progressively increasing wage system in order to bring about general consciousness of the disadvantages and risks of job hopping.

(3) Establishment of research and development capability for garment industry technology

Besides the existing LATU and UTU, a research and development institution dedicated to fundamental technology and accepting product development on consignment ought to be established, although various impediments can be foreseen. The idea could easily collapse if factors such as construction of required buildings, completion of research and development facilities and education and training of personnel are not thoroughly considered. Such an institution is indispensable for the Uruguayan garment industry if it intends to advance toward its goal of establishing a modern textile and garment industry. Seminars for the textile and garment industry would open the way for guiding enterprises and transferring technology; having such an institution as a nucleus could provide part of the operational revenue. The institution would alleviate the burden of cost of risky research and development for individual companies and would provide an accessible means of consultation and advice on corporate management and business in general.

(4) Companies' need for consultation

What should be emphasized here is that specific technologies, management techniques, knowledge of corporate

management, wisdom and perceptions can effectively be linked to the operational results of companies by going through consultation. Consultation is intended to alleviate the burden on corporate management by sharing part of the problems confronting them. The purpose of a consultation service should be to introduce external services as needed for the planning and implementation of an aggressive management strategy, instead of evasion of management risk. It should also be system of external assistance and support for the implementation of enterprising management.

Accordingly, such a consultation service should be based on voluntary approach by companies rather than pressure from higher level institutions. Should such a voluntary request arise, an authoritative institution or body would e needed to respond to it. A permanent institution of this kind would be an important step towards development of the Uruguayan textile and garment industry into the industry base within Latin America. It is a matter of course that training and educating talented persons who ar able to give a consultation to enterprises is a previous question.

No reform can be achieved without cost. Results of the reform must be balanced with cost. The recommendations outlined have not yet been balanced with cost, appropriate to need. Some of these recommendations may be selected for implementation, some stopped from immediate consideration, and some may have to be modified before adoption. The recommendations have intentionally been presented for consideration at this stage with the primary emphasis on need.

### 2-6-3 Reinforcement of education and training system

Uruguay is proud of its relatively high literacy rate among Latin American countries. However, the system of education and training within the garment industry, which has a relatively short history, is not well organized when

compared with those of textile industries with longer histories and traditions.

It is therefore desirable that the government, industry associations and garment manufacturing enterprises should cooperate with each other to reinforce the system of education and training in order to upgrade the level of the Uruguayan garment industry. High value added production, establishment of the production of diverse varieties in small quantities and differentiation of products are indispensable for the survival and growth of the industry, including export expansion.

Creators, merchandisers, and CAD/CAM operators are needed in addition to in-house engineers and middle management staff to support the shift of enterprises in that direction. Unfortunately, creators merchandisers and CAD/CAM operators are in extremely scant supply in the Uruguayan garment industry.

Accelerated development of these human resources is linked to upgrading the level of the Uruguayan garment industry to bring it international recognition.

An alternative may be to send people to advanced fashion industry countries for education and training.

Yet, reinforcement of the existing professional training school (UTU) with a design department and advanced course and establishment of a specialized education and training institution in Uruguay are considered more desirable in order to train as many personnel as possible.

## Chapter 3 Reform Measures of Individual Enterprises Based on Production Control

On the basis of the field study, this chapter proposes that some renovation of individual companies in the Uruguayan garment industry is feasible in terms of production control, quality control, and material and product inspection.

It is believed possible that Uruguayan companies can improve their products and reduce production costs by implementing these suggestions, which may require a certain amount of effort on their part. For reference, production costs reported by Uruguayan garment manufacturers are contrasted with those of 12 small and middle scale ready-made garment manufacturers in Japan.

### 3-1 Definition of Production Control, its Essential Points and Method, and Effects

#### 3-1-1 Definition of production control

In simple terms, production control means the overall control of production comprising "a series of means to accomplish the production of commodities of given quality, cost, and quantity within a given period of time" (source : Apparel Engineering Dictionary). Efficiency improvement in terms of each of these factors--quality, cost, quantity, and delivery date--is considered indispensable for production control.

Accordingly, production control would realize the expected results through implementation of primary control of quality, cost, and process. In addition, equally serious consideration must be given to the precise secondary control of facilities, labor, materials, transport, subcontracting and energy.



The expression "production control in narrow terms" often means control of quantity and delivery date only. In this case, control will be centered on two functions: production planning and production control. The term "production planning" means to design production processes, to determine timing and methods of material procurement, to plan the sequence and timing of production, and to prepare the required standards in compliance with the target quantity and timing of production determined by market demand forecast and received orders. The term "production control" means to arrange and issue instructions for material procurement and work, and to monitor actual production and adjust any discrepancies with the production plan.

Production control in the garment industry has characteristics which differ from the machinery industry, automobile industry, and electronics industry. The definition of production control in the garment industry, its essential points and method of control, and intended effects are discussed below.

### 3-1-2 Essential points and method of production control

#### (1) Essential points of production control

Garment production control is classified into two categories depending on the method of production: continuous production of small varieties in large quantities and discrete production of wide varieties in small quantities. The essential points of the control of a continuous production system, such as predominates in Uruguay, are as follows. Those of a discrete production system shall be discussed later.

- 1) Production capacity is designed in accordance with volume of demand.

- 2) Production is planned to proceed at a specific level at all times. Subsequently, a volume of inventory sufficient to absorb fluctuations in demand needs to be carried.
- 3) Quality is built into the process. (Process must be standardized to prevent rejects.)
- 4) Process capacities must be balanced. (To improve line formation efficiency.)
- 5) Control and planning are based on standard time and standard cost, in order to simultaneously reduce time and cost.

### 3-1-3 Effects of production control

Production control is primary control of quality, process, equipment, and cost. Its resultant effects are as follows.

#### (1) Cost reduction

- 1) Primary units of material and subsidiary material can be reduced.
- 2) Useless work is removed and rework is reduced.
- 3) Costs associated with rejects are reduced.
- 4) Inspection and test costs are reduced.

#### (2) Quality improvement

- 1) Confidence in the quality of products is built.
- 2) Rejects are reduced simultaneously with quality improvement.

#### (3) Increased production; rational production planning

- (4) Buyer confidence in the product is built, leading to market expansion.
- (5) Corporate organization is rationalized and inter-organizational relations become smooth.
- (6) Repair and expansion of plant and equipment are implemented rationally and on a priority basis.

Implementation of production control that generates these effects is of critical importance. Implementation of such production control is possible only through the joint efforts of executives and all employees working on the production line, in the office, and in sales and service. Human relations must be improved in order to establish a corporate-wide cooperative system.

### 3-2 Quality of Fabrics and Knit Garments

Various flaws were identified in fabrics and knit garments currently manufactured in Uruguay by the survey conducted in retail stores and other sales outlets in Uruguay. The Uruguayan garment industry should draw the attention to the following points.

#### 3-2-1 Quality of woolen garments

The quality of heavy woolen garments including suits manufactured in Uruguay may be ranked in the middle or low end of the mediocre class on a worldwide scale. Points noted on which finished products require more attention are as follows.

- . Sewing is coarse, in particular with regard to lining. Staggered seams can be seen.
- . Sewing yarn is not neatly finished.
- . Collars are not neatly finished.
- . Pockets are not neatly finished. Bar tacking is missing sometimes. In particular, flaps are not finished neatly.
- . Button holes are not finished neatly.
- . sleeves are not sewn well. Sleeve defects are often found.
- . Lining is exposed sometimes.
- . Quality of lining is poor.
- . Belt loops are not sewn neatly.
- . Seams are not cleanly divided.

- . Pressing is inadequate.
- . Press marks can be seen sometimes.
- . Garments are not well balanced as a whole (pattern is poor).

Although quality cannot be produced merely by inspection, more care should be taken in the inspection of products to be merchandise.

Insofar as each worker is supposed to check his work before handing it over to the next process, flaws in sewing should be prevented. For example, sleeve defects are often due to a pattern defect even when sleeves are sewn to notch marks. Immediate action taken by supervisors notified by a worker who has identified such a pattern defect should minimize the damage to products. (Part III, Fig. III-2-1.)

In the case of pressing marks, mat hardness must be checked. If a hardened mat is replaced immediately, no pressing marks will show.

Quality is an outgrowth of the process itself. Action must be taken to enhance the concern and adherence of workers to the quality of their work. While education is important, a system to encourage proposals to improve the quality of products that offers enticing rewards for excellent proposals should serve to encourage laborers to be more serious about the quality of their work.

This is particularly true for sewing where (i) the will to do a better job, (ii) proficiency and (iii) concern with quality all count on the part of individual laborers. The posture of managers and supervisors is also important. More attention should be paid to the education of managers and supervisors rather than to the education of laborers.

The coat hangers used by Uruguayan sewing factories are found to be shabby. Not only are heavy garments often hung on wire hangers during intermediate production processes, but also final products are hung on wire hangers.

The form of a coat hanger is critical in preventing garment distortion. It is also critical for smart shop front presentation of the garment. If poor hangers are used, deep diagonal creases may develop and the prestige of otherwise high quality garments may be damaged.

Every garment manufacturer in Japan has coat hangers tailored to its own patterns not only for use during production but also for storage and shop front display as well. Massive tailor-made wooden coat hangers are used for high class garments instead of plastic molded coat hangers.

Every effort is made to enhance the prestige of one's own products.

The quality of coat hangers is an important factor needed to confirm appropriate sewing matched to one's own patterns. In particular, proper shoulder lines and sleeve sewing can hardly be confirmed when wire hangers are used. More care must be paid to the quality of coat hangers used, should one be concerned with the quality of one's products.

### 3-2-2 Quality of denim garments

Cotton for denim garments is imported in the form of raw cotton or cotton yarn. The quality of denim fabric manufacture in Uruguay is acceptable.

OEM production has been contracted with Uruguayan companies by such top world wide brands as Levi's, Lee, Wrangler and Adidas. Flaws similar to those identified for woolen garments can be identified as well with the quality of denim garments. It must be kept in mind, however, that

requirements for fashionable garments are different from those for practical work clothes.

The quality of non-brand jeans for consumption by the general public (mostly imported from Brazil and Southeast Asian countries but including some Uruguayan products) is inferior to the quality of top brand jeans.

Except for these second class products, the quality of Uruguayan jeans and denim garments is sufficiently acceptable.

### 3-2-3 quality of knit garments

As mentioned earlier, the quality of Uruguayan knit garments on average is reasonably acceptable for both hand knits and machine knits, although quality may vary from one manufacturer to another. The fact that overseas buyers stringently check products exported by Uruguayan companies has served to improve quality. Japan in particular is said to be the most stringent buyer with respect to quality, irrespective of whether the product is highly priced or not. Points noticed with respect to knit garments purchased from the surveyed enterprises follow.

- . Outlet seam of side seam is not deep enough. Margins must be no less than 5mm. Margins for products like jacquard knits in which backside yarn is floated must be no less than 10mm.
- . Sewing yarn often breaks when tension is applied to shoulder seam. Except for linking or heavy thick sweaters, shoulder seam must be reinforced with tape to prevent tensile elongation (spun tape, knit tape, string, same fabric and so on).
- . Firmness of ribs in the bottom or edge of sleeve is not often sufficient. Using more yarn (adding one strand to

rib) or tighter knitting, use of spandex should be investigated to improve the quality of ribs.

- . Finish of products is sometimes found unacceptable. Consumers in Japan often check the right to left balance of a sweater by spreading it. Balance is one point to check in Japan. Perhaps Uruguayan consumers do not care much or do not notice. Some products are distorted to tilt toward the left. This is due to the fact that the finishing method involving placing the sweater over a frame, as used in Japan, is not common in Uruguay and the quality of finish work may vary from one laborer to another.
- . In some products, the size of button holes was found to be too small. It is common sense to adjust button hole size to button diameter plus button thickness.
- . Buttons are not properly positioned. Front sides of some cardigans do not overlap neatly when put on a body stand.
- . Some buttons are not stitched properly. Thread must be tied firmly to finish after thread shank has been wound 3 - 4 times.
- . Quality of buttons used is poor when compared to the quality of garment. Use of buttons of higher quality would upgrade value of the garment and would justify higher prices.



### 3-3 Controls of Production, Quality, Process, Machinery and Cost in Garment Industry

Uruguayan enterprises carry out the following controls of production, quality, process, machinery, and cost accurately, which results in removing faults of garment product and leading quality improvement and cost reduction.

#### 3-3-1 Production control

The production and quality control items that should be implemented by individual companies in the garment industry are as follows.

##### (1) Production control of woolen fabric garments

Production control applicable to woolen fabric garments is different from that applying to other industries in the following respects.

- 1) Curves of different shapes have to be sewn together to assemble a garment through three-dimensional forming using easing contracting and gathering techniques.
- 2) The materials used are elastic, soft, easy to deform and difficult to control mechanically.
- 3) Parts and accessories are minimally interchangeable with one other. They differ from each other with respect to design, color and pattern, raw materials and size and are therefore difficult to control.
- 4) Diverse varieties of garments in small quantities must be produced to achieve high added value. Control of such production is difficult without proper systematization.
- 5) Short product cycles are required in an era of quickly changing fashion. Without proper control of delivery

commitment, buyers will suffer the consequences of late delivery and companies may lose their clients.

Production is subject to the severe conditions mentioned above. Without implementing a well organized system of production control covering the entire cycle of planning, design, cutting, sewing, finishing, shipment, sales and returns, various forms of waste and inefficiency may occur and may unfavorably affect production profitability.

The form of production control applicable to the garment industry may differ between a system to produce individually diverse varieties in small quantities and a system to produce small varieties in large quantities. The principal points of control for a system of individual production are as follows.

- 1) Delivery commitment must be accurately estimated and diligently observed.
- 2) Quality characteristics required by customers must be clearly identified.
- 3) Cost must be accurately estimated. A chart of standard man-hours, which is important for the estimation of cost, must be prepared and arranged in advance.
- 4) Day to day production planning and division of work must be carried out in such a manner as to minimize switch-over time for each process.
- 5) Redundant time in each process must be correctly identified.
- 6) Accessories must be standardized as much as possible so that common accessories can be used to the maximum extent.
- 7) Inventory of accessories must be controlled properly.

- 8) Each process leader must be capable of properly guiding the production of individual products.
- 9) Production is heavily dependent upon the proficiency of individual workers. Appropriate laborers must be allocated properly.
- 10) Supervisors are must emphasize understanding switch-overs and the progress and control of work. They must also be capable of dealing with anomalies at all times.

Without proper management of the above items, stable production cannot be achieved.

(2) Production control applicable to denim garments

Denim garments are in principle work clothes, and production in any country is by the bundle system of single item mass production. Consequently, individual laborers are proficient with work divided into unit operations of less than 1 minute duration (for example, sewing a zipper onto the front) and receive bundles of materials required for their task which they repeat over and over, all day long.

Managers are responsible for allocating laborers and supplementing machines in short supply or repairing faulty machines in order that all operations can continue ceaselessly without interruption due to a shortage of materials or equipment anywhere in the product manufacturing flow.

Furthermore, as fashionableness is more and more required, additional operations such as detailed cutting or design must be added. Managers are responsible for responding properly to the needs of human and mechanical resources in relation to such bypass work, and to check quality, delivery commitment and production cost aspects of production.

The fundamental responsibilities of managers concerning production control are almost same as the production control items listed in section 2-2-1 for woolen fabric garments.

(3) Production control applicable to knit garments

First, the properties of knit fabrics must be accurately differentiated from those of textiles.

1) Distinguishing features of knit fabric

- . Light weight
- . Elasticity
- . Soft texture
- . Anti-crease property
- . Easy to fit to body line and easy to move
- . High heat retaining property due to high air content.

While knit fabric has these properties, its processing is plagued with many problems.

2) Problems specific to knit fabric

- . Loops are likely to run in ladder from yarn being broken or damaged by needle holes.
- . End of fabric may curl.
- . Fabric may distort obliquely.
- . Pilling may occur easily.
- . Snagging may occur easily.

Care must be taken not to spoil the favorable properties of knit fabrics during production of knit garments, in particular with respect to sewing.

Sweaters, cardigans and vests are types of products made from stitch knit fabrics that particularly take advantage of the properties of those fabrics more than other types of knit

garments.

Production of knit garments including stitch knits must strive to produce products which are superior sensually and physically in response to buyer demand for stable quality, in the designated quantity, within the delivery commitment and at low cost.

Production efficiency must be upgraded by utilizing a proper production control system, improving production processes and improving technology including automating production and use of labor saving techniques together with carefully thought out production control measures.

Production of garments is shifting more and more toward diverse varieties, high sensitivity, high quality, short cycle time and small lots, production control is becoming more and more complete. Conventional methods of production control that rely simply on experience and intuition are no longer capable of coping with such needs. No company can expect to grow and develop without implementing scientific and reasonable production control.

### 3-3-2 Quality control

#### (1) Quality control applicable to woolen fabric garments

The term "quality control" should be interpreted to mean achieving the quality characteristics required by consumers. In terms of production however, it is understood to mean production in exact compliance with the quality characteristics designated by specifications and instructions.

The principal points of quality control are as follows.

- 1) Quantity characteristics shall be identified. (Fill in the instructions with pattern, material, lining, accessories,

sewing yarn and so on, accurately.)

- 2) Quality standards, work standards and inspection standards to apply must be confirmed.
- 3) Responsibility for quality must be understood and confirmed. (Each process must check the quality of its own work in order not to pass defective products to the next process. Defective products must be rejected by the final inspection and must not be shipped.)
- 4) Processes must be stabilized and improved. (Each process must be controller in order not to produce defective products.)
- 5) Improvement of quality (Strive to implement improvements in order to produce products of good quality)

The planning division should negotiate with customers in order to confirm the quality characteristics they require and should prepare a quality plan sheet. The quality plan sheet so prepared should be handed over to the technical divisions which play a fundamental role in production. Quality standards, inspection standards and work standards which must be observed as in-house standards should be prepared by the technical division, while easily understandable production instructions should be sent to production divisions together with the required materials. Semi-finished products should be inspected at the end of every process in order to ensure that defective semi-finished products are prevented from proceeding to the next process. Inspection should conform to the applicable inspection standard. In Japan, any defect identified during in-process sewing inspections, in accordance with the applicable instructions, is reported first to the supervisor and section manager in charge for examination. If the instructions are found to be inadequate by the on-site section manager, the finding is reported to the technical section manager with a request for appropriate

modification. If the technical section manager agrees that the instructions need to be modified, the sales section manager is informed accordingly. The sales section manager then contacts the relevant customer and negotiates the modification of quality characteristics requirements. Those operators who successfully identify defects during in-process inspections and take the necessary actions through the corporate organization in order to implement quality improvement measures are of course given commendations. It is most critical to ensure that defective semi-finished products do not proceed to next process and to ensure that defective finished products are not passed on to customers.

(2) Quality control applicable to denim garments

The majority of denim garment sewing factories in Uruguay are engaged in OEM production of European and American brands. Their quality of production is acceptable because factories are producing in compliance with quality standards designated by the brand licensor. Those products for distribution in the Uruguayan market are also in compliance with the same quality standards as required by the brand licensor and no problem has been identified.

However, under the current situation, where OEM production has decreased drastically, a problem has been identified in that products which have apparently been made from inexpensive give-away materials or non-brand materials and yarn and accessories of inferior quality, as needed for the maintenance of low cost production, have been seen from time to time. Stabilization of product quality is very important.

(3) Quality control applicable to knit garments

Quality control is intended to reduce defects and achieve uniform product quality, and yield additional benefits in the form of cost reduction and improved productivity that raise

corporate profits and improve the position of the enterprise. It is therefore imperative that the reasons for quality improvement be clearly identified and exhibited to employees at all times, not just when anomalies have occurred. In order to concretely achieve these goals in production processes, main and auxiliary materials complying with applicable quality standards must be used and work must be carried out in compliance with applicable instructions. Furthermore, facilities must be thoroughly inspected and maintained at all times so that quality control activities are sustained and developed positively and consecutively.

The principal reasons for quality defects and the appropriate corrective measures are as follows.

- 1) Design mistakes → Establish design check system.
- 2) Defects in materials and auxiliary materials → Reinforce acceptance test, clarify and confirm purchase specification to be applied.
- 3) Inappropriate inspection → Check and review method of inspection, arrange standard to be applied, check instruments used for inspection.
- 4) Defects in machinery and facilities → Establish a system of repair and maintenance, check and review need for renovating outdated machinery and facilities.
- 5) Processing defects → Reinforce guidance of operations, standardize methods of operation.

Operation mistakes in the production process are primarily due to human factors including simple mistakes committed by laborers, lack of proficiency on the part of laborers, mistakes in guidance, lack of instruction and so on. In this respect, it is of utmost importance to endeavor to upgrade the level of quality control and the technological



power of the enterprise as a whole, while promoting establishment of standards applicable to the education of laborers and work to be performed, and mechanization and automation of work. Reinforcement of product inspection only without reinforcing the other measures mentioned above would not lead to improvement, but rather would lead to a vicious cycle where defects increase, eventually requiring a larger number of inspecting personnel to reinforce inspection once again.

### 3-3-3 Production process control

- (1) Production process control applicable to woolen fabric garments

Production process control is an important item of management for factories. Production plan, layout of production process, allocation of personnel, layout of facilities and procurement of materials must all be planned, and instruction on day-to-day production plan, arrangement of accessories and division of operation must be implemented. Items such as progress of production, rate of redundancy, analysis of discrepancies between planning and actual results, and feed-back of the results of analysis are equally important subjects of management.

Certain enterprises have introduced CAD systems to manage those items. However, unless software to suit the characteristics of the enterprise is also introduced, and the enterprise is capable of developing the required software by itself to some extent, such a CAD system may not be utilized fully. While use of computer systems is desirable for management of the progress of production, such an investment should be carefully thought out in view of the enormous amount of money involved including software acquisition and development.

(2) Production process control applicable to denim garments

In view of the current state of denim garment production, in which CAD/CAM and automated sewing machines are not used extensively, the level of production process analysis and control of denim garment production are considered to be sufficiently advanced.

However, the more production of denim garments shifts from the hitherto single item mass production method to multiple item production in small quantities, the more work will be required for process analysis, process design, and pattern paper production. The short supply of high level technical staff and non-use of robots linked to CAD/CAM systems has made it impossible to fundamentally improve the situation. Development of high technology and improvement of productivity has reached the limit in view of the technical proficiency of Uruguayan laborers.

Industry in Japan has been obliged to rely on CAD/CAM in order to improve productivity, but perhaps more to compensate for the quality of available labor. The current situation in Uruguay is not very different from the situation in Japan and the issue urgently needs to be studied,

(3) Production process control applicable to knit garments

Methods of production process control applicable to knit garments are not fundamentally different from those applicable to woolen fabric garments. However, individual companies are plagued by deteriorating productivity and delays in shipment due to the diversified and complex processes of their current knit garment production methods, where multiple items have to run simultaneously within shorter delivery commitments.

Accurate production planning to actually move into production as soon as possible after order acceptance is

indispensable to solve those problems.

Work processes, facilities, personnel, materials and the man-hours needed for production planning must be studied and procedures (process analysis and design) must be planned. A day-to-day production plan should be prepared by comprehending the available production capacity including the volume of work awaiting each process, times of completion, redundant capacity, and so on. Actual production should then commence while planning and actual results are compared and analyzed. Any discrepancy must be fed back for rectifying actions to be taken. Progress in and delay of production must be accurately managed and controlled.

Principal reasons for delays in shipment and corrective measures

- 1) Order acceptance in excess of available capacity and technological level

This is due to unwarrantable order acceptance or indiscriminate order acceptance and is said to be the cause of more than half of actual delays in shipment.

→ Measures such as accurate comprehension of available production capacity and rate of redundant capacity, upgrading of technological level and proper use of subcontracting are needed.

- 2) Incompetence of delivery management

This is due to a lack of centralized management or to allowing things to follow their natural course.

→ Clear definition, by computer system, of the responsibilities to be borne by production line and management are needed.

3) Mistakes in following instructions, incompetence of labor

→ Thorough implementation of quality control system, standardization of work methods, preventive maintenance of facilities and proper day-to-day production planning are needed.

4) Delay in the procurement of materials

Delays due to uncoordinated procurement of materials including yarn, materials, accessories and auxiliary materials.

→ Through implementation of a material management system, advance procurement and/or an inventory cushion and so on are needed.

5) Absenteeism, short supply of manpower

Low morale of work force, difficulty in recruiting labor

→ Activation of work force, establishment of proper working environment, utilization of part-time labor, use of subcontractors and so on are needed.

### 3-3-4 Management of machinery

(1) Management of machinery applicable to woolen fabric garments

Machinery including sewing machines and presses, however aged, which is properly inspected and maintained regularly is supposed to operate properly. Every operator must inspect and maintain the machine he/she is responsible for as if it were his/her own property to ensure that it operates properly at all times. Certain factories were found to be well arranged and clean with well maintained machines while other factories were found to be disarranged. Factories must be kept well arranged and clean at all times in order to produce

products of high quality.

It is important to prepare daily, weekly and monthly management log books and maintenance standards for every sewing machine together with complete records of maintenance.

Routine daily management of sewing machines should be the responsibility of their operators and inspection and cleaning instructions must be exhibited in a place visible to every operator.

The following are needed as part of routine daily inspection and cleaning.

- 1) Needle plate must be removed to clean both sides of needle plate, feed dog and hook using a cleaning brush.
- 2) Dust accumulated on presser, arm head, and table must be wiped off and removed.
- 3) Legs and their surroundings must be cleaned.
- 4) Oil pan must be inspected and waste yarn and cloth removed. Oil must be inspected for fouling.
- 5) Oil level in oil pan must be checked.
- 6) Whether operating noise of rotating machine is normal, and whether oil level is within the inspection window must be checked.
- 7) Thread handling area must be inspected to ensure it is not scratched.
- 8) Whether knee lifter is properly angled, whether pressing pressure is normal, whether presser is not floating and whether tension release is normal must all be checked.

- 10) Whether machine head and spool pin are neither damaged nor missing must be checked.
- 11) Footboard must be checked for correct angle, and to ensure it is not loose.
- 12) Whether motor noise is normal, whether clutch gap is normal, whether switch operates properly and whether electric cord is not scratched must all be checked.
- 13) Completeness of accessories must be checked.
- 14) Sewing machine must be inspected to ensure it is properly oiled.

It is important that all items listed above are inspected every day without fail, and that any anomaly identified is reported to personnel in charge of maintenance for repair so that sewing machines are kept operational at all times.

Some pressing machines were found not only to be aged, but also to have a stiffened ironing mat. An overly stiff mat is likely to cause press marks, and air cannot penetrate it. Setting is not effective if ironing is performed on a stiff surface.

Mats of acceptable quality are readily available. Stiffened mats should be replaced immediately. A three-dimensional automated pressing machine capable of simultaneously pressing body, shoulder, arm hole and sleeve is also available. Such a machine may not be profitable or fully utilized if purchased and used by a single company. Joint use of such an automated pressing machine by multiple companies is recommended for consideration as a cooperative undertaking.

(2) Management of machinery applicable to denim garments

repairing and maintenance method of machinery is same for any other type of garment. In particular, daily routine cleaning, inspection, oiling and adjustment significantly affect the life of machinery and quality of garments produced. At the minimum, items 1) - 14) need to be implemented as the responsibility of operators.

Many Uruguayan enterprises have standards applicable to the maintenance of sewing machines with respect to oiling and cleaning. The fact that such oil sewing machines are still operational is good evidence of the efforts being made.

No problem was identified with respect to soap, chemicals and equipment used in chemical wash and stone wash plants for finishing jeans garments, when compared to the current situation in Japan.

(3) Management of machinery applicable to knit garments

In contrast to the woolen fabric and denim garment industries where sewing machines are the mainstay of production, knitting machines are the mainstay of knitwear manufacture. No sewing machine can produce knit garments without knitting machines. The variety of knitting machines currently used in Uruguay is so diverse as to encompass household hand knitting machines, old type automatic knitting machines, relatively mechanically simple manual knitting machines and state-of-the-art computer integrated knitting machines. In other words, the knitting machine used for a given process may be a relatively simple, manual single function machine or a multi-function machine based on the latest high technology such as a very accurate computer integrated stitch knit machine. Due to the differences between languages and methods used by various manufacturers of knitting machines, it is not easy to discuss management of this machinery in detail. However it should be remembered

that the history of Uruguayan knit garments is not short and knitting machines have been used over many years. Knitting machines must have been managed in accordance with the guidance of manufacturers. We therefore intend to discuss fundamentals only in this section.

#### 1) Computer integrated stitch knit machine

In order to stably operate knitting machines over many years, it is necessary to regularly clean and oil them instead of leaving them unattended until they fail. This goes not only for computer integrated stitch knit machines, but for all types of knitting machines. As knitting machines become more and more high precision and high speed, better maintenance and repair become proportionally more important.

##### a) Periodic cleaning

. Select jack and selector underneath the needle bed jack must have waste thread and dust cleaned out every 8 to 10 hours. If not cleaned, a needle selection fault or breakdown of the actuator might occur.

Dust deposited on the tension wire might provide a certain amount of tension on the yarn, or side tension might cause the yarn to be cut. Tension wires must be cleaned regularly.

. Carriage must be cleaned regularly in order to prevent adverse effects on the movement of cam and actuator.

. Recent computer integrated knitting machines are provided with dust cleaners. Any dust accumulated in the dust case must be removed regularly. The dust cleaner filter must be cleaned regularly once every day by hitting it.



## b) Regular oiling

- . Most knitting machines are now provided with a collective oiling system which can be charged up with one touch using an oil pump. Once every day knitting machines rocking side plates, etc. must be oiled by pulling the lever. Oil pump filter must be inspected and cleaned at least once every year.
- . Oiling of various points other than by oil pump must be done according to the instructions specific to every type. For reference, an up-to-date type of knitting machine specified oiling of the needle bed (jack, select jack, selector), carrier rail, carriage rail and carriage guide sliding rail once every day, and re-greasing of ball screw unit once every year.

## c) Others

- . replacement of controller memory battery (error message will indicate "battery voltage drop") and inspection of belt tension should be done once every six months.
- . For a computer integrated stitch knit machine, the debug mode of the computer controller can self-check faults. The self-check test must be performed regularly in order to confirm proper function of solenoid and other components.

## 2) Household knitting machine

The types of knitting machines currently used in Uruguay are relatively old ones compared to the state-of-the-art high technology types currently used in Japan. The older knitting machines are that much simpler and easier to maintain. The following routines must be practiced to maintain those machines properly.

a) Regular cleaning

The types of yarn most frequently used are wool or alpaca yarn of relatively loose twist. A considerable amount of fuzz detaches from the yarn to be deposited onto the knitting machines. If possible, knitting machines should be cleaned every day after the end of operation. At a minimum, knitting machines should be cleaned once every 2 - 3 days even when the volume of deposited dust is relatively small. In case knitting work must be switched from dark color yarn to pale color yarn, the knitting machine should be cleaned thoroughly in order to prevent migration of dark color fuzz and fragments.

b) Regular oiling

The rail groove and needle groove must be oiled regularly to make movement of carriage and needles smooth. The lubricating oil used should be a low viscosity machine oil. Oiling must not be excessive in order to prevent oil stains.

3) Others

a) Management of sewing machines and pressing machines should be the same as listed in (1) for woolen fabric garments. Management of linking machines should correspond to the same.

b) An adequate inventory of spare consumable parts must be held at all times for immediate replacement. Care must be taken to keep an adequate inventory of spare parts such as consumable needles and similar consumables in order to prevent inadvertent disruption of production.

3-3-5 Cost control

The price at which products are supplied to users is a critical factor affecting the performance of a business enterprise. Together with the annual production plan

prepared by the production manager, accurate cost calculation is the basis for sales planning, cost planning, and profit planning. It is critical to confirm the costs of materials, accessories, each process and overhead, to coordinate sales prices with costs in order to be able to estimate profits, and to present to those in charge of sales the cost figures and predetermined sales prices. It is necessary to collect data on past results in order to be able to confirm cost composition and to establish target costs. While annual planning is critical, it is equally important to encourage all employees to comprehend the cost reduction plan and to achieve the established cost reduction target through a variety of means.

### 3-4 Quality Items Required for Garments

#### 3-4-1 Quality characteristics required for garments

The weight placed on various quality characteristics may vary from time to time as time goes by. During a period when merchandise is in short supply, emphasis is placed on long-lasting, durable merchandise. During a period of affluence emphasis shifts to fashionableness, beauty and sensual characteristics that satisfy the desires of consumers. This does not mean that durability can be sacrificed on account of fashion. Merchandise must be durable as listed under item 3 of required characteristics in Table III-3-1.

Table III-3-1 Quality characteristics required for garments

Required quality	Quality characteristics
1 Appreciation of beauty	Distinguishing features of fabric, color and pattern, design, workmanship, drape property, fashionableness, ostensibility, feeling
2 Clothing comfort	Sanitary, (warmth, coolness, air permeability, electrostatic property, anti-mildew property, drape property
3 Durability	Toughness, color change and fading, surface shape retention, (change in luster, pilling, fuzziness), shape retention
4 Special characteristics	Safety (skin damage, oral toxicity, combustibility, guard property, hygiene and curative property (supporter, corset and so on)
5 Storage, wash resistance	Storability (shape retention, anti-crease property, anti-mildew property), wash resistance (anti-dry cleaning, anti-ironing, anti-pressing property)
6 Functional	Ease of wearing, ease of removing, ease of movement, fitting property, touch, handle

### 3-5 External Appearance Inspection of Materials and its Details

#### 3-5-1 External appearance inspection of fabric material and its details

##### (1) Check items at the time of purchase

The following items need to be checked at the time of purchase of materials from vendors by garment manufacturing enterprises.

- (1) Composition ..... To be designated
- (2) Fineness, yarn count ... To be designated
- (3) Density ..... To be designated
- (4) Width ..... To be designated (+0.5 inch for 69 - 70 inch width)
- (5) Length ..... To be designated (less than +5% against designated length)
- (6) Weight per sq. meter ... To be designated (less than +5%)
- (7) Texture ..... To be designated
- (8) Inspection of ..... To be within the standard of external appearance buyer
- (9) Handle or feeling ..... To be similar to the sample of buyer
- (10) Uneven dyeing ..... Nil
- (11) Straightness ..... Grain - less than 1 inch, skew - (Grain, skew, bow) less than 1 inch at the top)
- (12) Cuts ..... Nil
- (13) Damage ..... Nil
- (14) Fault and/or stain ..... Less than 5 in 50m length to be marked by strings in selvage. 20cm or less per fault or stain.
- (15) Fastness of color ..... To be in compliance with the standard of buyer
- (16) Physical properties ..... To be in compliance with the standard of buyer

It is important that buying companies prepare their own standards. In case such a standard cannot be prepared by individual companies, it is necessary that the industry as a whole consult with the Asociacion de Industrias Textiles del Uruguay and prepare such standards as needed.

(2) External appearance material inspection items

Items for the inspection of external appearance of materials are listed in Table III-3-2.

Table III-3-2 External appearance inspection items

Item of inspection	Description
1 Grain	Inspection of skew, bow, mismatching and streaks.
2 Uneven dyeing	Inspection of dappled dyeing
3 Uneven width	
4 Faults and/or stains	Inspection of yarn faults such as uneven yarn, coarse yarn, fine yarn, slub. Inspection of weaving faults such as weaving bars, reed marks, warp streaks, temple marks. Inspection of dyeing finish faults such as stains, washer wrinkles, mill wrinkles, shading marks, straightness.
5 Appearance	Appearance means conditions of finished fabric surface. Inspection of craping, fuzziness.
6 Handling or feel	Visual inspection of luster, brilliance. Tactile inspection of smoothness, crispness, stiffness, spread, fullness and softness, drape.

An important inspection item is material grain.

Texture is a standard for sewing processes beginning with cutting and ending with sewing. Marking should be preceded by checking the texture for cutting. Sewing should be preceded by checking the texture of warp yarn. Inspection of finished products should emphasize checking whether the texture of warp yarn is straight. Products in which warp yarn texture is not straight are stressed somewhere and often

their shape is distorted. In particular, the front texture is not straight if there are deep diagonal creases in the front shoulder.

Warped or staggered checker affects texture. Staggered checker can be recognized by every body and spoils product quality. Forced alignment of checker during sewing results in distortion after wearing, even when it seems aligned at the time of finish. The same applies to striped fabrics. Forced alignment of parts with stripes of different widths during sewing will result in distortion after wearing.

In the case of cutting parts for fine garments, every part must be aligned with the others for checker after cutting. The positions where checker is aligned are pad stitched. The cutting out of pieces is done only after checker has been aligned part by part. This is a very time consuming process. The sewing factory must strongly request fabric manufacturers to ensure that checker size is fully aligned.

Warp streaks and wrinkle marks occurring during the weaving process or finishing process include fine streaks and coarse streaks. The same applies to uneven dyeing. If streaks in warp yarn direction have not been checked by fabric manufacturers and are sewn in by the sewing factory, quality of the whole lot may be affected. Failure to check warp streaks can result in very serious damage, while an unchecked mark may result in damage to one garment only.

In particular, washing marks and dyeing marks occurring during the finishing of woolen fabric are set at the end of the finishing process and are difficult to detect after the woolen fabric has been finished. Sometimes, these marks may surface during the pressing stage of the sewing process.

Rolls which are found to contain apparent color discrepancies can be rejected during inspection. In general,

color discrepancy is rather difficult to check by inspection. Color discrepancy may be due to uneven warp extension during weaving or processor damage to fibers by temple marks, resulting in uneven shrinkage in the direction of width causing a color discrepancy between the end where density is higher and the central part, or a higher degree of dye absorption by a portion where fibers had been damaged by temple resulting in a color discrepancy between that end and the central part. Suspect rolls, such as gabardine or venetian fabrics with more warp yarns, or pieced dyed rolls must be checked for color discrepancy between the ends and the center by making a plain seam with ends and center.

Color discrepancy occurs rather often between the front and side body of a suit. This can happen when the angle of twill in the warp yarn direction is sharp, as may be found in gabardine fabric. This is due to the difference of twill angles of front and side body parts when they are plain seamed.

The tolerance permitted in fabric width is less than  $\pm 3/4$  inch for finished width of 69 - 70 inches. Depending upon the type of fabric, this tolerance is sometimes difficult to meet. Differences in fabric width not only result in cutting losses, but also result in stripe width and checker size differences from roll to roll, and differences in handling or feel.

Care must be taken with fuzzy rolls, the appearance of which may sometimes be affected.

Defects resulting in rejection of material in Japan were the grounds for claims and complaints in the following order:

Uneven yarn - weaving defect, grain - color discrepancy (including uneven dyeing) - bar.

Uneven dying and weaving defects are subject to the



conflicting interests of consumers, distributors, sewing manufacturers and material manufacturers, each of whom may have different standards of judgment. A written standard would be too abstract to be applicable to actual disputes. It is therefore desirable that sewing manufacturer and material manufacturer exchange limit samples and mutually agree upon the tolerable variation.

The acceptable stain length may differ from one country to another. While one country may accept 20cm for one mark, another country may accept only 10cm. It would be desirable to establish a unified standard applicable at least to local vendors.

Uneven handling or feel may result in different appearance from one finished product to another. When exhibited in retail stores, consumers may recognize a lack of uniformity in the quality of products from the same lot.

Discrepancy in the quality of products may occur with milled finish material, in which differences in handling or feel mean differences in surface texture. The judgment of handling or feel is sensual. Except for very delicate differences, it is important to check finish width and square weight carefully at the time of acceptance. It is important to compare rolls from the same lot for substantial differences.

It is the generally accepted practice that external appearance inspection of the above items is normally conducted by material manufacturers, with inspection data provided to sewing manufacturers. Quality of materials and auxiliary materials including accessories is very important with respect to the workmanship of finished products. It is most necessary to maintain continual and close communication with raw material suppliers in order to ensure thorough mutual consultation and to secure supply of flawless raw materials.

### 3-5-2 Knit material external appearance inspection items

#### (1) External appearance inspection items

Manufacturers of woolen fabric garments and denim garments produce products by inspecting, cutting, sewing and finishing processes, after having accepted fabrics from textile manufacturing factories. Manufacture of fabrics is separate from sewing, thus procurement of high quality materials is vital for garment manufacturers.

On the other hand, manufacturers of knit garments, in particular stitch knit garments, are so organized as to process yarn by themselves to produce garments including knitting and sewing (including linking). (Sewing of so called cut sewn products including circular knit fabrics or knit shirts is very similar to sewing of fabrics.) In the case of sweaters, no case exists requiring the inspection of knit fabrics supplied by others for sewing. Inspection covers the external appearance of semi-finished products, rather than supplied materials. In the case that external appearance of stitch knit or circular knit fabrics must be inspected, the external appearance inspection items for woolen fabrics listed earlier may be applicable correspondingly.

For reference, the inspection standard guidelines summarized by the Central Association of Textile Wholesaler Unions in Japan include the following external appearance inspection items (excerpt of items related to stitch knit fabrics).

Table III-3-3 External appearance inspection items

Inspection item	Description
1 Width W-width S-width	+3.0% - -0.0% against contracted width +2.5% - -0.0% against contracted width
2 Length	+5.0% against contracted length
3 Weight	+5.0% against contracted weight
4 Straightness	Max. less than 3.0%, but varies from one type to another
5 Discrepancy of pattern	Not to be conspicuous. For every repeat within less than 3cm, less than 3.0% in vertical direction and less than 2.0% in horizontal direction.
6 Joint	Not to be conspicuous.
7 Overall defects	Not to be conspicuous.
8 Local defects	Number of conspicuous defects within standard area as accumulated for one roll shall be less than the designated number.

(2) Inspection of material properties

As mentioned in the preceding section, the external appearance of sweaters is inspected in semi-finished stages. The yarn and accessories to be used must be inspected before processing for the required properties. Except for blending ratio, yarn should be knit into a swatch for inspection. there are many official inspection authorities in Japan corresponding to LATU in Uruguay. Swatches are sent for inspection to those authorities in many cases, to collect data as needed. In some cases, submission of the needed data is requested from the spinning industry, yarn manufacturers, dyeing processors or accessory manufacturers involved in manufacture of the materials.

Table III-3-4 and Table III-3-5 list inspection items and standard values for typical wool and cotton knit materials produced in Uruguay.

Table III-3-4 Quality standard : Composition and property (Knit)

Inspection item	Method of inspection	Wool knit	Cotton knit
1 Blend ratio	JIS L 1030	To comply with marking	
2 Rupture strength [kgf/cm <sup>2</sup> ]	JIS L 1018 A (Mullen method)	Worsted thick: 4.0 Worsted thin: 3.0 Worsted: 3.0	Thick: 4.0 Thin : 3.0
3 Shrinkage factor [%]			
.Washing	JIS L 1018 H Flat drying		Vertical +5, -2 Horizontal +7, -2
.Soaking	JIS L 1018 C Cotton : D method flat drying	Vertical +5, -2 Horizontal +7, -2	Vertical +3, -2 Horizontal +5, -2
.Press	JIS L 1042 H-2 (Steam heated oven)	Vertical +3, -2 Horizontal +4, -2	+3
.Dry cleaning	JIS L 1018 E-2	+2	+2
4 Pilling [Class]	JIS L 1076 A (ICI form)	3 (1.5H, 5H)	3 (Apply to synthetic short fiber blend)
5 Pile retention [%]	JIS L 1075 A (Universal form) Abrasion : Wool: 300 times Cotton 500 times	60	60
6 Reverse [Class]	JIS L 1901	(Applicable to print)	

(Remarks) : Thick : > 150g/m<sup>2</sup>  
 Others : < 150g/m<sup>2</sup>

Table III-3-5 Quality standard : Dyeing fast color (Knit)

1 Daylight fading resistance [Class]	JIS L 0842 JIS L 0843 No.3 exposure	4 (3*) [* Applicable to pale and bright color]	4 (3*) [* Same as left]
2 Washing [Class]	JIS L 0844 (Wool : A-1 Cotton : A-2)	Color change and fading : 4 Stain : 3 (Fluid stain: 3)	Color change and fading : 4 Stain : 3 (Fluid stain: 3)
3 Water [Class]	JIS L 0846 A	Color change and fading : 4	Color change and fading : 4
4 Sweat [Class]	JIS L 0848 A	Color change and fading : 4 Stain : 3	Color change and fading : 4 Stain : 3
5 Abrasion [Class]	JIS L 0849 II	Dry : 4 (3-4*) Wet : 3 (2-3*) [* Applicable to dark color]	Dry : 4 (3-4*) Wet : 3 (2-3*) [* Same as left]
6 Dry cleaning [Class]	JIS L 0860 JIS L 0861 (Applicable to dry cleaning marking)	Color change and fading : 4 Stain : 4	Color change and fading : 4 Stain : 4

(Remarks) : Attached white cloth : Wool = wool and cotton  
Cotton = Cotton and silk

The inspection items applicable to fast color in Japan are the 5 items including either washing or dry cleaning, in relation to illustrated care instruction marking.

Large scale department stores and mass sales shops normally request submission of test data in advance for approval, without which acceptance is refused, or demand immediate submission of test data whenever a fault occurs.

Tests must be conducted for all counts and data must be kept, in principle, for a minimum of 3 years. There are other inspection items (Bleed, sweat, daylight fading resistance and fastness of sublimation) which apply as necessary. Inspection methods are unified by JIS and the applicable JIS standard is as listed above. Standards of ISO, of which Uruguay is a member, may be applied in Uruguay.

No inspection as mentioned above, covering composition, properties or fastness of color, of Uruguayan knit products was made by the study team, so no data is available. However, color fastness of Argentine sweaters as checked by JETRO in 1991 was such that 8 (33.3%) out of 24 sweaters so checked were found to be unacceptable. It is therefore considered necessary to inspect Uruguayan sweaters on a variety of points.

### 3-6 Inspection of Garment Products

#### 3-6-1 Inspection of fabric products

As a principle of quality control states, "Quality must be produced by the entire process." Inspection alone cannot produce quality. The objective of inspection is to check whether or not the targeted quality requirement has been met. Inspection fulfills the function of identifying and feeding back problems, as well as the function of ensuring the required quality for safe use by consumers.

In order to ensure that products can be used safely by consumers, intra-process quality checking is important. As mentioned earlier, identification of problems only by the final inspection may lead to significant losses. It is therefore considered necessary to repeatedly check quality in this sequence: material acceptance inspection, intermediate inspection during sewing processes, pre-finish inspection, and final inspection. With respect to the material acceptance inspection, material vendors should be requested to provide information on material properties and the results of inspection of essential items mentioned earlier. On the basis of that data, the sewing factory should conduct its acceptance inspection. Any defects identified should be marked by a method suitable to the buyer. Fuzzy materials should be checked for the direction of fuzz and should be marked appropriately. Straightness should also be marked appropriately before fabric is sent to the cutting process. Individual sewing and pressing operators need to check by themselves the portion they have processed prior to sending semi-finished products to the next process. Workmanship of the front must be checked after the completion of forepart forming. Gauge checking of the front must be done, and after the completion of sleeve sewing the products must be put onto a human body to check size. Details of final inspection may differ from item to item. The followings are the inspection items applicable to jackets.

- 1) Is texture straight?
- 2) Is direction of fuzz not reversed?
- 3) Are patterns aligned? Is there no color discrepancy?
- 4) Are sewing seams as instructed?  
Is there no seam slippage?
- 5) Is folding seam as instructed?
- 6) Is adhered interlining not detached?
- 7) Is sewing thread as instructed?
- 8) Is number of stitches as instructed?
- 9) Is there no shrinkage by sewing, no missing stitches, no broken sewing thread?
- 10) Are stitches uniform and neatly aligned?
- 11) Is there no puckering?
- 12) Are seams finished neatly?
- 13) Are blind stitches in place?
- 14) Is over-lock neatly put?
- 15) Is lining held firmly onto shoulder height and outside leg?
- 16) Is sleeve lining held firmly?  
positions?
- 18) Is bar tacking correctly positioned and firmly held?
- 19) Are button hole size and button size properly coordinated?
- 20) Are pockets correctly positioned?  
Is bar tacking correctly positioned?
- 21) Are there no press marks?
- 22) Are name and marking correctly attached?
- 23) Is thread properly finished?
- 24) Are there no marks nor stains?
- 25) Are left and right properly balanced and uniform?
- 26) Is no lining exposed?
- 27) Is overall workmanship good?
- 28) Is size as shown in marking?

In Japan, JIS L 4111 "Fabric pants and long pants" and JIS L 4208 "Ready made suit" are the standards applicable to final inspection. In addition, IWS provides item by item guidelines as the wool mark standard. It would be necessary to apply ISO or UNIT to the final inspection in Uruguay.



### 3-6-2 Inspection of knit garments

There may be cases where people would wonder why certain garment defects have not been identified by inspection. It should be remembered that garment inspection is neither simple nor easy. Garments cannot be inspected for acceptance in terms of function only, like precision instruments or electrical equipment. No standard has been yet established with regard to readings of test instruments, nor is the simple fact that a garment can be worn taken as the standard of acceptance.

The situation is due to:

- . Innumerable varieties in the properties of various auxiliary materials, and
- . Design qualities of various approached, and the fact that
- . Overall quality of finished products is a result of complex combinations of processing qualities which are different from each other.

Judgment of garment quality will never be free from the difficulties inherent in a process which depends so heavily upon the five human senses; the appreciation of beauty and wearing comfort can vary significantly from one individual to another. Nevertheless, one must fully appreciate that inspectors must be of the highest caliber; they must be capable of identifying defects through stringent inspection, and must be able to judge what the underlying causes of defects are, and what improvement or rectification actions are called for.

Individual manufacturers are believed to be applying unique methods of inspection, specific to each enterprise, on the basis of past experience and actual results. Which method of inspection is correct is not easy to say.

Consequently, general points of knit garment inspection are listed hereunder for reference.

(1) Check of quality marking

- . Is the quality marking attached as called for under the applicable laws (including those of countries to which the garment is to be exported)?
- . Is quality marking stitched to the garment in addition to the loose tag? Are contents of the stitched quality marking and tag identical with each other?
- . Are illustrated care instructions appropriate to materials used and product?
- . Is the wool mark type correct?

(2) Check of knit fabric

- . Does knit fabric become elongated, and does it recover its shape with difficulty when pulled?
- . Are loops beautifully aligned?
- . Are milling, nap-raising and nap-shearing uniform and well averaged?
- . Is inside yarn of single jacquard sweater not excessively flying?
- . Is loosely twisted yarn resistant to pilling and losing fuzz?

(3) Check of details

- . Is V-neck point neatly finished? Is V-neck point not stiffened?

- . Are left and right collar shapes matched and uniform?
- . Is collar elongation not obstructive for dressing and undressing? Is opening of turtle neck collar or cool neck collar adequate?
- . Is overlapping of under-front and top-front of cardigan or vest neat?
- . Is front width averaged and not twisted? Is tape not extruding?
- . Are positions of button holes and buttons appropriately aligned? Are buttons easy to fasten and undo?
- . Are buttons firmly attached? Does button attaching thread resist pulling off?
- . Are button holes neatly darned? Does darning thread resist falling off?
- . Is stretch of sleeve and cuff adequate? Does sleeve allow arm to pass through easily?
- . Is stretch of girth of bottom rib stitch or cuff rib stitch adequate?
- . Are pockets correctly positioned? Are both ends of pocket opening firm?
- . Are left and right pockets balanced?

(4) Check of sewing

- . Does sewing thread not break when manual tension is applied to knit fabric?
- . Is sewn portion even?

- . Is shoulder linking firm? Is shoulder linking reinforced by tape?
- . Is sleeve fixing outlet seam sufficient? Is there no missing stitch in outside leg?
- . Is there no twist nor missing stitch in side sewing?

(5) Check of dyeing, finish, size and so on

- . Is there no color discrepancy between front knitting, and collar or accessory knitting? Is there no color discrepancy between knit fabric and sewing yarn?
- . Is there no uneven color or uneven knitting?
- . Has a smaller knit garment not been forcefully stretched for finish?
- . Are collars not collapsed by finishing?
- . Are dimensions of major parts within the limits designated by applicable specifications and instructions?

There are so many inspection items applicable to knit garments. Their inspection is not intended only to identify defects needing rework. The objectives of inspection are (1) to prevent delivery of defective products not only to the next process but also to consumers, and (2) to provide quality information, to prevent recurrence of defects, and to ensure stable quality. Information on inspection results such as in what process so many defects have occurred should be accurately fed back to the preceding process where causes of defects should be pursued and identified. Measures to rectify defects should be established and implemented. Unless efforts are made to establish a framework to promote a system that does not produce faults, and educate personnel in its operation, the value of inspection will not be fully utilized

and no reduction of defects can be expected.

### 3-6-3 Damage due to failure to carry out inspections

The damages due to insufficient inspection or nonperformance of inspections can be summarized as follows :

- (1) Damage directly due to the use of defective raw and subsidiary materials

Rejects should be expected. In the extreme case, production lines have to be stopped and delay of product shipment may result.

- (2) Discounting the price of defective products

Defective products would need to be discounted in order to be sold.

- (3) Cost of claim processing

Additional costs would be incurred for visits, examinations and re-testing pertinent to claims filed. The cost of replacing defective products may be incurred.

- (4) Cost of rework and disposal

Additional cost would be incurred for reworking defective products. Those not reworked would have to be disposed of at additional cost.

- (5) Loss of clients and market due to defective products

Shipment of defective products may lead to the loss of credibility and subsequently to the loss of clients and market.

Insufficient inspection or nonperformance of inspections

is likely to result in significant damages as outlined above.

Performance of appropriate and accurate inspections is therefore critical.

Table III-3-6 summarizes garment production control.

Table III-3-6 Summary of garment production control

1. Definition of production control	The term "garment production control" means overall control of "a series of production tasks to produce garments of given quality, cost, and quantity within given a delivery schedule." Accordingly, the intended result of production control is achieved by effectively implementing primary production control including quality control, process control, machinery control and cost control.	
2. Essential points and method of production control	<p>(1) Characteristics of a continuous production system (production of a small variety of goods in large quantity)</p> <p>1) Process capacity is designed to match the volume of demand.</p> <p>2) Production is planned for a constant level at all times; accordingly, an inventory of finished products must be carried at all times to absorb fluctuations in demand.</p> <p>3) Quality is built into the process. (Process is standardized and managed in order to prevent rejects.)</p> <p>(2) Characteristics of a discrete production system (production of a wide variety of goods in small lots)</p> <p>1) Delivery date must be estimated accurately and committed to.</p> <p>2) The quality characteristics required by customers must be determined.</p> <p>3) Production cost must be estimated accurately. Man hour (operation time) standards are critical to the calculation of production cost.</p> <p>4) Daily production schedule and job assignments must be planned in order to minimize the change-over time between processes.</p> <p>5) The redundant time of each process must be comprehended at all times.</p> <p>6) Standardized accessories and common items must be used as extensively as possible.</p> <p>4) The capacities of individual processes are balanced (to elevate overall efficiency of the entire production line).</p> <p>5) Standard time and standard cost are established as the criteria of control and planning, in order to reduce time and cost.</p> <p>7) Inventory control of accessories is critical.</p> <p>8) The leader of each process must be capable of leading production of individual products.</p> <p>9) Operators must be allocated appropriately because the particular proficiencies of each individual operator are important.</p> <p>10) The superintendent must give serious consideration to process change over and the progress and management of production. He must be capable of dealing with anomalies.</p>	
3. Effects of production control	<p>(1) Cost reduction</p> <p>1) Primary units of material and subsidiary material can be reduced.</p> <p>2) Useless work can be eliminated while rework is reduced.</p> <p>3) Costs associated with rejects are reduced.</p> <p>(2) Quality improvement</p> <p>1) Confidence in the quality of products is built.</p> <p>2) Quality is enhanced while rejects are reduced. Quality is simultaneously made more uniform.</p> <p>(3) Production is increased. Rational production planning becomes possible.</p> <p>(4) The confidence of buyers is gained and the market expands.</p> <p>(5) The corporate organization can be rationalized. Interrelations within the corporate organization become smooth.</p> <p>(6) Repair and expansion of facilities and equipment can be made rationally and in accordance with priorities.</p>	
4. Characteristics of production control of garment industry	<p>1) Garments are assembled by way of three dimensional forming which involves the sewing together of different shaped curves, easing contracting and gathering.</p> <p>2) Garment material is shrinkable and soft. It is subject to deformation which is difficult to control mechanically.</p> <p>3) Parts and accessories have very little interchangeability. They differ from each other in design, color, pattern, material and size, and are difficult to control.</p> <p>4) Production of wide varieties in small lots is critical for high value added production, but is difficult to achieve unless production control is systematized.</p> <p>5) Fashions can change within a short cycle time. Unless delivery commitments are maintained strictly, customers can suffer, leading to the loss of orders.</p> <p>6) Up till now, production control in the garment industry has been haphazard in most cases, and based merely on experience and instinct. The shift to high value added production of wide varieties in small lots within a short delivery period cannot be achieved without implementing scientific, rational production control. Without such production control methods, no manufacturing enterprise can develop successfully.</p>	
5. Quality control (1) Basics of quality control	<p>1) Clarification of quality characteristics (Pattern, material, lining, accessories, sewing thread and so on must be clearly described in instructions.)</p> <p>2) Clarification of quality criteria, work standards and inspection standards</p> <p>3) Clarification of the responsibility for quality (preventing rejects from moving to the next process; clarifying each operator's quality checking responsibilities)</p> <p>4) Stabilization and improvement of processes</p> <p>5) Improvement of quality (efforts to produce products of better quality)</p>	
(2) Reasons for occurrence of rejects and reform measures	Reasons	Reform measures
	<p>1) Design mistake</p> <p>2) Inferior material or subsidiary material</p> <p>3) Improper inspection</p> <p>4) Inferior equipment and facilities</p> <p>5) Improper processing</p>	<p>- Establishment of design check system</p> <p>- Intensified acceptance inspection</p> <p>- Establishment of inspection methods and inspection standards, establishment of test methods</p> <p>- Establishment of preventive maintenance program; renewal of outdated equipment</p> <p>- Intensified operation guidance and standardization of operation</p>

(continued)

<p>(3) Reasons for delay in delivery and reform measures</p>	<p>1) Acceptance of orders exceeding production capacity                  2) Improper delivery control                  3) Mistakes in instruction, insufficient ability on the part of operators                  4) Delay in material procurement                  5) Absenteeism, insufficient supply of labor</p>	<p>- Accurate comprehension of production capacity and redundancy; upgrading of technical capability; utilization of appropriate subcontracting                  - Clarification of responsibilities; management with the assistance of computers                  - Standardization of operation methods; preventive maintenance of facilities; rationalization of daily schedule                  - Intensified material control; advanced procurement and inventory cushion                  - Activation of job site; maintenance of work environment; utilization of part-time workers and subcontracting</p>																																						
<p>6. Management of machinery                  (1) Textile garments (Sewing machine example)                  (2) Knit garments (Computer integrated stitch knit machine example)                  (Household knitting machine example)</p>	<p style="text-align: center;">Cleaning</p> <p>1) Dust and oil on the backside of needle plate, feeding teeth, hook                  2) Dust on arm head, table                  3) Legs and their vicinity                  4) Check for waste thread, cloth in oil pan and contamination of oil.</p> <p>1) Waste thread and dust underneath the needle table jack (to be cleaned every 8 - 10 hours)                  2) Tension wire, side tension, carriage, interior                  3) Dust cleaner filter</p> <p>1) Needle noise at the end of operation                  2) Thorough cleaning prior to change over to knitting with different color yarn.</p>	<p style="text-align: center;">Oiling</p> <p>1) Spot where an anomaly occurs in rotation noise                  2) Volume of oil in oil pan                  3) Thorough observance of routine, weekly, monthly oiling instructions</p> <p>1) Oiling of the rocking sliding plate of centralized oiling system                  2) Replacement of oil pump filters (once every year)                  3) Observance of manufacturer's oiling instructions</p> <p>1) Regular oiling of rail groove and needle groove                  2) Observance of manufacturer's oiling instructions</p>	<p style="text-align: center;">Other check items</p> <p>1) Scratches or damage on machine head, spool pin, thread guide, electrical wiring                  2) Condition of needle point                  3) Motor noise, clutch gap, switch operation                  4) Angle of footboard, thread tension release                  5) Appropriate inventory of consumables</p> <p>1) Check battery for controller memory, belt tension (every 6 months)                  2) Check machine functions using controller debug mode</p> <p>1) Appropriate inventory of consumables                  2) Check items for textile sewing machines apply equally to various sewing machines and linking machines.</p>																																					
<p>7. Inspection of materials                  (1) Check items at the time of purchase</p>	<p style="text-align: center;">Check items</p> <p>1) Composition ..... As specified                  2) Fineness, yarn count ..... As specified                  3) Density ..... As specified                  4) Width ..... As specified (+0.5 inches for 69-70 inches)                  5) Length ..... As specified (less than ± 5 % variance)                  6) Weight per square meter .... As specified (less than ± 5% variance)                  7) Texture ..... As specified                  8) Inspection of external appearance ..... To be within specified criteria                  9) Handling or feel ..... To be in conformity with specified sample</p> <p>10) Uneven dyeing ..... None                  11) Grain, skew, bow ..... &lt; 1 inch skew, &lt; 1 inch bow                  12) Cuts ..... None                  13) Damage ..... None                  14) Faults and/or stains ..... No more than 5 over 50m, string mark shall be attached to selvage, 20cm to be deducted per fault.                  15) Fastness of color ..... In compliance with specified criteria                  16) Physical properties ..... In compliance with specified criteria</p>																																							
<p>(2) External appearance inspection items</p>	<p style="text-align: center;">External appearance inspection items for textile material</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 20%;">Inspection items</th> <th style="width: 80%;">Details of inspection</th> </tr> </thead> <tbody> <tr> <td>1) Grain</td> <td>- Inspection for skew, bow, mismatching, streaks</td> </tr> <tr> <td>2) Uneven dyeing</td> <td>- Inspection for uneven dyeing</td> </tr> <tr> <td>3) Uneven width</td> <td>- Yarn faults: Inspection for uneven yarns, coarse yarns in the uneven yarns, fine yarns, slub.</td> </tr> <tr> <td>4) Faults and/or stains</td> <td>- Weaving faults: Inspection for weaving bars, reed marks, warp streaks, temple marks.                      Dyeing faults : Inspection for stains, washer wrinkles, mill wrinkles, dyeing wrinkles, shading marks, straightness</td> </tr> <tr> <td>5) Appearance</td> <td>- External appearance of finished textile. Inspection for craping, fuzziness</td> </tr> <tr> <td>6) Handling or feel</td> <td>- Items to be judged visually - inspection of luster, brilliance. Items to be judged tactually - inspection of smoothness, crispness, stiffness, spread, fullness &amp; softness.</td> </tr> </tbody> </table>		Inspection items	Details of inspection	1) Grain	- Inspection for skew, bow, mismatching, streaks	2) Uneven dyeing	- Inspection for uneven dyeing	3) Uneven width	- Yarn faults: Inspection for uneven yarns, coarse yarns in the uneven yarns, fine yarns, slub.	4) Faults and/or stains	- Weaving faults: Inspection for weaving bars, reed marks, warp streaks, temple marks. Dyeing faults : Inspection for stains, washer wrinkles, mill wrinkles, dyeing wrinkles, shading marks, straightness	5) Appearance	- External appearance of finished textile. Inspection for craping, fuzziness	6) Handling or feel	- Items to be judged visually - inspection of luster, brilliance. Items to be judged tactually - inspection of smoothness, crispness, stiffness, spread, fullness & softness.	<p style="text-align: center;">External appearance inspection of knit material</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 20%;">Inspection items</th> <th style="width: 20%;">Details of inspection</th> </tr> </thead> <tbody> <tr> <td>1) Width</td> <td>W width S width</td> </tr> <tr> <td>2) Length</td> <td>- +3.0% - 0.0% of contracted value</td> </tr> <tr> <td>3) Weight</td> <td>- +2.5% - 0.0% " " "</td> </tr> <tr> <td>4) Straightness, pattern straightness</td> <td>- +5% " " "</td> </tr> <tr> <td>5) Pattern pitch discrepancies</td> <td>- +5% " " "</td> </tr> <tr> <td>6) Cuts</td> <td>- Max. less than 3.0% but differs by type</td> </tr> <tr> <td>7) Whole faults</td> <td>- To be inconspicuous. 1 repeat for more than 3cm shall be less than 3.5 in vertical direction and less than 2.0% in horizontal direction.</td> </tr> <tr> <td>8) Partial faults</td> <td>- To be inconspicuous</td> </tr> <tr> <td></td> <td>- " " "</td> </tr> <tr> <td></td> <td>- Total number of faults per roll as counted by conspicuous faults per square meter shall be less than as specified</td> </tr> </tbody> </table>		Inspection items	Details of inspection	1) Width	W width S width	2) Length	- +3.0% - 0.0% of contracted value	3) Weight	- +2.5% - 0.0% " " "	4) Straightness, pattern straightness	- +5% " " "	5) Pattern pitch discrepancies	- +5% " " "	6) Cuts	- Max. less than 3.0% but differs by type	7) Whole faults	- To be inconspicuous. 1 repeat for more than 3cm shall be less than 3.5 in vertical direction and less than 2.0% in horizontal direction.	8) Partial faults	- To be inconspicuous		- " " "		- Total number of faults per roll as counted by conspicuous faults per square meter shall be less than as specified
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(to be continued)



(continued)

8. Inspection of external appearance of finished products	Inspection of external appearance of textile garment	External appearance inspection of knit garment
	<ul style="list-style-type: none"><li>(1) Check of quality labeling<ul style="list-style-type: none"><li>1) Are name and label correct?</li><li>2) Are dimensions the same as labeled?</li></ul></li><li>(2) Check of sewing<ul style="list-style-type: none"><li>1) Is texture straight?</li><li>2) Is direction of fuzz not reversed?</li><li>3) Is the pattern matched? Are there no color discrepancies?</li><li>4) Is the stitching as specified? Is the stitching not slipped?</li><li>5) Is outlet seam as specified?</li><li>6) Is fusible interlining not peeled off?</li><li>7) Is sewing thread as specified?</li><li>8) Is the number of stitches as specified?</li><li>9) Is there no shrinkage by sewing, no missing stitch, no cut thread?</li><li>10) Is the stitching uniform and neat?</li><li>11) Is there no puckering?</li><li>12) Are seams finished?</li><li>13) Are blind stitches in place?</li><li>14) Is overcasting neatly in place?</li><li>15) Are shoulder height and outside leg lining seams finished?</li><li>16) Are sleeve lining seams finished?</li></ul></li><li>(3) Check of finish, size<ul style="list-style-type: none"><li>1) Are positions of buttons and accessories correct? Are they attached firmly?</li><li>2) Is position of bar tacking correct? Is it finished firmly?</li><li>3) Are button hole positions and button sizes correct?</li><li>4) Are pocket positions correct? Is bar tacking correctly finished?</li><li>5) Are there no press marks?</li><li>6) Is thread finished properly?</li><li>7) Are there no flaws or stains?</li><li>8) Is garment balanced between right and left?</li><li>9) Is there no lining sticking out?</li><li>10) Is overall workmanship good?</li></ul></li></ul>	<ul style="list-style-type: none"><li>(1) Check of quality labeling<ul style="list-style-type: none"><li>1) Is legally stipulated quality labeling attached (including any required by the importing countries)?</li><li>2) Is quality label sewn to garment in addition to tag?</li><li>3) Do graphic symbols match the material used and other characteristics of the product?</li><li>4) Is the type of wool mark attached appropriate?</li></ul></li><li>(2) Check of knit fabric<ul style="list-style-type: none"><li>1) Is knit fabric extended to its full length and not overly stretchable?</li><li>2) Are loops of knit fabric neatly aligned?</li><li>3) Are milling, nap-raising and shearing uniform and averaged?</li><li>4) Is backside yarn of a single Jacquard sweater not leaping?</li><li>5) Is loosely twisted yarn not easy to peel or prone to losing fuzz?</li></ul></li><li>(3) Check of details<ul style="list-style-type: none"><li>1) Is joint of V-neck finished neatly? Is point of V-neck not stiff?</li><li>2) Are shapes of right and left collars well matched with each other?</li><li>3) Does elongation of neck size not obstruct putting on and taking off? Is opening of turtle neck or cool neck appropriate?</li><li>4) Do upper and lower fronts of a cardigan or a vest neatly overlap with each other?</li><li>5) Is width of front averaged and not twisted? Does no tape stick out?</li><li>6) Are button positions matched to button hole positions? Are they easy to fasten and unfasten?</li><li>7) Are button holes firmly sewn? Is there no loose thread?</li><li>8) Are button holes neatly hemstitched? Is there no loose thread?</li><li>9) Is stretch of sleeve or cuff adequate?</li><li>10) Is stretch or shrinkage of the girth of bottom or cuff adequate?</li><li>11) Is pocket position correct? Are both ends of pocket opening firmly finished?</li><li>12) Are right and left pockets well balanced?</li></ul></li><li>(4) Check of sewing<ul style="list-style-type: none"><li>1) Is no sewing thread severed when sewn fabrics are manually tugged apart?</li><li>2) Is seam not tangled?</li><li>3) Is shoulder firmly sewn? Is it reinforced by stretch proof tape?</li><li>4) Is cut edge of heavy textile shoulder overcasted or split sewn?</li><li>5) Is outlet seam of armhole sufficient? Is there no missing stitch in the inside of armhole?</li><li>6) Is side seam not twisted or there is no missing stitch in side seam?</li></ul></li><li>(5) Check of dyeing, finish, size<ul style="list-style-type: none"><li>1) Are colors of body and accessories matched with each other? Are colors of knit fabric and thread matched with each other?</li><li>2) Are color and knit even?</li><li>3) Was a small sized garment not forcibly stretched to finish? Was color not deformed by finish?</li><li>4) Are sizes of small parts within the tolerances specified by specification or by instruction?</li></ul></li></ul>
9. Damage due to failure to carryout inspection	<ul style="list-style-type: none"><li>(1) Damage directly due to the use of defective raw and subsidiary materials Rejects should be expected. In the extreme case, production lines have to be stopped and delay of product shipment may result.</li><li>(2) Discounting the price of defective products Defective products would need to be discounted in order to be sold.</li><li>(3) Cost of claim processing Additional costs would be incurred for visits, examinations and re-testing pertinent to claims filed. The cost of replacing defective products may be incurred.</li><li>(4) Cost of rework and disposal Additional cost would be incurred for reworking defective products. Those not rewrought would have to be disposed of at additional cost.</li><li>(5) Loss of clients and market due to defective products Shipment of defective products may lead to the loss of credibility and subsequently to the loss of clients and market.</li></ul>	

(the end)



### 3-7 Cost Comparison between Japanese and Uruguayan Garment Industries

A comparison of average production costs of Uruguayan garment manufacturers using woolen fabrics and 12 healthily managed Japanese enterprises manufacturing ready-made suits and dresses is summarized in the table below. Accounting items in Japan and Uruguay may not be identical, but the comparison serves as a rough guide (Table III-3-7).

Costs in Uruguay are accounted in new pesos, which have been converted at the rate of NP 2000/1 US\$. Japanese costs have been converted at the rate of Yen 130/1 US\$. The costs of the 12 healthy ready made garment manufacturers are as summarized in the "Index of middle and small scale businesses" prepared and published by the Agency of Middle and Small Scale Businesses.

#### (1) Break-even ratio

The break-even ratio has been calculated by the following formula.

$$\text{break-even ratio} = \frac{\text{sales corresponding to break-even}}{\text{sales}} \times 100$$

Where:

$$\text{sales corresponding to break-even} = \frac{\text{fixed cost}}{1 - \frac{\text{variable cost}}{\text{sales}}}$$

Uruguay = 50.9% Healthy company  
Japan = 85.5% Company requiring care

As far as these results are concerned, Uruguayan companies appear much healthier than their Japanese counterparts.

The reason is that in the case of Uruguayan companies the proportion of production costs represented by material costs is 24.2%, higher than that of their Japanese counterparts by 3%, while the proportion of labor costs is about 20%, 19 percentage points less than the 39% of their Japanese counterparts. It can clearly be seen that labor intensive industry is no longer viable in Japan.

(2) Added value ratio

Added value has been calculated by the following formula.

$$\text{added value ratio} = \frac{\text{sales} - \text{variable cost}}{\text{sales}}$$

Uruguay = 70.9%

Japan = 60.4%

The added value ratio of Japanese enterprises is 10 percentage points less than their Uruguayan counterparts. This is due to the very high ratio of labor costs to fixed costs.

The following management approach would be required to increase added value.

- 1) Sales price must match raw material costs.
- 2) Products with higher market prices must be developed.
- 3) Yield of raw materials and accessories must be improved.
- 4) Production waste must be reduced.
- 5) Rework and rejects must be reduced.

The problem for Uruguayan enterprises is that added value is low while raw material costs are high.

(3) Annual sales per employee

As shown in Table III-3-7, annual sales per employee is as follows.

Uruguay = 12,800 US\$  
Japan = 47,800 US\$

The figure for Japan is four times larger than that for Uruguay. It is clearly shown that Japanese enterprises are gaining higher added value while maintaining a higher level of productivity.

(4) Amount of mechanical equipment per employee

It is not possible to calculate the amount of mechanical equipment per employee in Uruguay due to insufficient availability of data.

Amount of mechanical equipment per employee in Japan is as follows.

amount of mechanical equipment per employee in Japan

$$= \frac{\text{equipment assets}}{\text{number of employees}} = 3,400 \text{ US\$}$$

The level of productivity is being improved through labor saving equipment, rationalization and standardization of work. Four (4) men's suits are finished per day per employee.

(5) Annual labor cost per employee

Annual labor cost per employee in Japan is seven times higher than that in Uruguay, while annual sales per employee in Japan is four times higher than that in Uruguay. The labor distribution factor is as follows.

$$\text{labor distribution factor} = \frac{\text{labor costs}}{\text{added value}} = \frac{\text{labor costs}}{\text{sales} - \text{variable cost}}$$

Uruguay = 28.8%

Japan = 64.6%

The ratio of labor costs is very high in Japan while it is very low in Uruguay.

It is said in general that the labor distribution factor should ideally be around 40%.

(6) Others

Financial cost issues can not be generalized due to differences in the financial policies of the two governments. Taking into consideration taxes, interest, export and import costs and losses due to currency exchange rate fluctuations, the ratio of financial costs in Uruguay is five times higher than in Japan. The financial cost burden on Uruguayan enterprises is significant.

Ratio of financial costs

Uruguay = 9.9%

Japan = 1.8%

Action by Uruguayan garment industry associations to appeal to their government for reduction of the financial cost burden is needed. There are no significant differences between Uruguayan Japanese manufacturers with regard to other accounting items.

Table III-3-6 Cost comparison of Uruguayan and Japanese garment industries

[unit of cost : 10<sup>3</sup> US\$]

Item	Uruguay			Japan		
	Cost amount	Ratio [%]	Ratio against sales [%]	Cost amount	Ratio [%]	Ratio against sales [%]
Material	1,408.7	37.1	24.2	1,838.8	23.4	21.4
Lighting and heat	29.6	0.8	0.5	62.3	0.8	0.7
Subcontracting	171.6	4.5	2.9	1,463.0	18.6	17.0
Transport	2.9	0.1	0	43.6	0.6	0.5
Repair and consumables	80.0	2.1	1.4			
<b>Total variable costs</b>	<b>1,692.7</b>	<b>44.6</b>	<b>29.0</b>	<b>3,407.8</b>	<b>43.3</b>	<b>39.6</b>
Labor	1,086.9	28.6	18.7	3,110.9	39.5	36.2
Social security charges	87.9	2.3	1.5	244.8	3.1	2.8
Miscellaneous costs	12.6	0.3	0.2			
<b>Total labor costs</b>	<b>1,187.4</b>	<b>31.3</b>	<b>20.4</b>	<b>3,355.7</b>	<b>42.7</b>	<b>39.0</b>
Repair	20.2	0.5	0.3	18.9	0.2	0.2
Communication	12.0	0.3	0.2	10.7	0.1	0.1
Taxes and dues	1.3	0	0	68.1	0.9	0.8
Samples	1.1	0	0			
Leases	15.0	0.4	0.3	118.9	1.5	1.4
Travel	18.2	0.5	0.3	18.6	0.2	0.2
Insurance premiums	10.0	0.3	0.2	5.2	0.1	0.1
Office expenses	4.9	0.1	0.1			
Financial expenses	30.3	0.8	0.5			
Export expenses	112.2	3.0	1.9			
Import expenses	0.7	0	0			
Losses due to currency exchange rate fluctuations	436.4	11.5	7.5			
Depreciation and amortization				132.2	1.7	1.5
Other expenses	252.4	6.7	4.3	729.9	9.3	8.5
<b>Total fixed costs</b>	<b>2,102.2</b>	<b>55.4</b>	<b>36.0</b>	<b>4,458.1</b>	<b>56.7</b>	<b>51.8</b>
<b>Total costs</b>	<b>3,794.9</b>	<b>100.0</b>	<b>65.2</b>	<b>7,865.9</b>	<b>100.0</b>	<b>91.4</b>
<b>Sales</b>	<b>5,820.3</b>	<b>153.4</b>	<b>100.0</b>	<b>8,602.3</b>	<b>109.4</b>	<b>100.0</b>
Number of working days	258.3			271.0		
Number of employees	454.7			180.0		
Sales per employee	12.8			47.8		
Labor cost per employee	2.6			18.6		

## Chapter 4 Implementation Method of Action Program

The measures selected for the short term action program as described in PART III, Chapter 1,

- (1) Institution of quality labeling system (quality improvement),
- (2) Implementation of cooperative efforts (cost reduction),
- (3) Reinforcement of UTU (development of human resources),
- (4) Implementation of Fashion Week (market expansion), and for the medium to long term action program, assuming the unanimous consent of MERCOSUR member nations,
- (5) Attraction of MERCOSUR fashion resource center shall be discussed in this chapter.

### 4-1 Institution of Quality Labeling System

#### 4-1-1 Need for quality labeling system

- (1) Assistance at purchasing and protection of consumers

The types of garments available have continued to diversify reflecting recent technological innovations as well as diversified consumer demand. Marking garments with the type, composition, and properties of materials used, as well as handling instructions in addition to size and design would assist consumers in selecting from the plethora of available products.

Appropriate marking of quality, property and handling is required from the consumer's point of view in order to ensure that garments are used properly.



(2) Quality improvement

If consumers are well informed of the quality of garments, they will be capable of selecting garments of the quality and property they desire. Garment enterprises would then be motivated to produce garments matching the needs of consumers in order to expand sales, leading to quality improvement.

(3) Import replacement

Consumers would pay attention to domestic garments if Uruguayan enterprises make better products, which leads import replacement.

4-1-2 Information to be displayed

(1) Composition, handling including laundering instructions, and country of origin

All garment products (yarn, textiles, clothing) must be labeled with material composition, almost all garments must be labeled with handling and care instructions, while specific items such as curtains or sheets must also be labeled with shrinkage, flame resistance, water repellency and dimensions. Furthermore, labels must display the name of the manufacturer, or product serial number together with country of origin, in order to identify the source of the product.

Table III-4-1 shows information to be displayed on garment labels.

Table III-4-1 Information to be displayed on garment labels

Garment	Textile composition	Shrinkage	Flame resistance	Handling and care	Size
Upper garment, trousers, skirt, sweater	0			0	
Blanket	0			0	0
Sheet	0	0		0	0
Curtain	0	0	0	0	0

Source: Laboratory under the jurisdiction of Ministry of International Trade and Industry

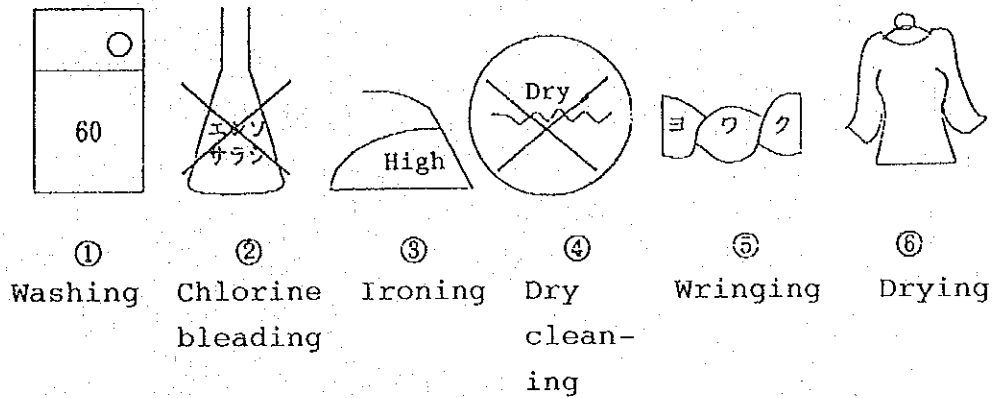
(2) Handling and care including household washing instructions

- 1) Handling and care including household washing instructions is to be displayed on labels in easily legible graphic symbols indicating method of cleaning or dry-cleaning, whether or not chlorine bleaching is appropriate, and methods of ironing, wringing, and drying.
- 2) The International Standards Organization (ISO) has been studying the situation for many years and finally instituted ISO 3758 (symbolic textile-care labeling code) on August 1, 1991 as a worldwide unified standard.

Accordingly, labeling marks specific to individual countries (ASTM, BS, JIS etc.) are being coordinated to agree with the ISO code.

3) Sequential order of symbol combination (according to JIS)

Garment care graphic symbols shall be combined from left to right as shown below.



(1) Washing : Machine washable at less than 60°C water temperature.

(2) Chlorine bleaching : Do not bleach with chlorine bleach.

(3) Ironing : Iron at less than 210°C.

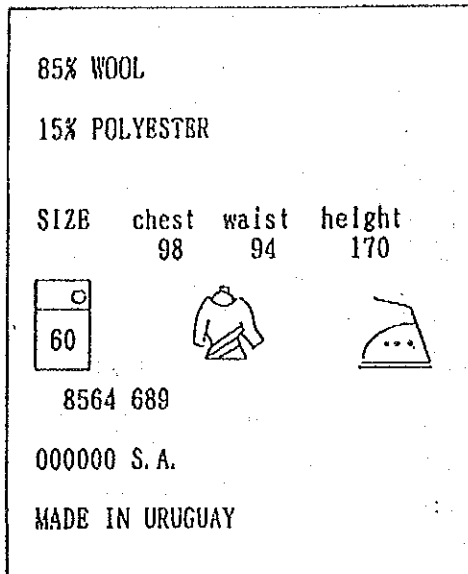
(4) Dry cleaning : Do not dry clean.

(5) Wringing : Hand wring gently or spin dry.

(6) Drying : Hang dry.

Remark: X mark should be written by red color.

(3) Example of quality labeling



The label shown to the left is an example of the labels to be attached to suits produced in Uruguay.

- (1) Composition
- (2) Size
- (3) Handling and care
- (4) Product serial number
- (5) Name of manufacturer
- (6) Country of manufacture

4-1-3 Implementation of quality marking system

(1) Propelling committee organization

The systematization of quality marking is a national undertaking and the committee in charge should comprise the following members in view of the need to disseminate the system throughout the nation:

National Quality Committee, Ministry of Industry, LATU under the jurisdiction of Ministry of Industry, CIV, PIU, Centro de Orientacion al Consumidor of the Direccion de Defensa del Consumidor y Contralor del Mercado under the jurisdiction of the Ministry of Economy and Finance, UNIT (Private Sector Non-Profit Technological Standards Association), Private Sector Consumer Groups, Intellectuals (Quality Control, Sociology)

(2) Business of the committee

The committee should comprise a secretariat and a technological subcommittee to conduct the following business necessary for implementation of a quality marking system. The committee should also invite internal and external intellectuals, dispatch study teams to advanced foreign countries, dispatch candidate inspectors to overseas countries for study and training and so on.

a) Business of secretariat

- \* Preparation of committee rules and planning of operating policies
- \* Collection of information concerning advanced countries and MERCOSUR member countries
- \* Preparation for the systematic, legal establishment of the quality marking system (composition marking, illustrated care instructions, country of origin marking)
- \* Review and preparation of the content of documentation needed
- \* Public relations activities targeted to businesses and consumers

b) Business of technological subcommittee

- \* Collection of information concerning ISO (International Standards Organization)
- \* Review and planning of standards applicable to product inspection
- \* List up and procurement of test and inspection equipment as needed

3) Flow chart up to the commencement of implementation of quality marking system (Example) is shown in Fig. III-4-1.

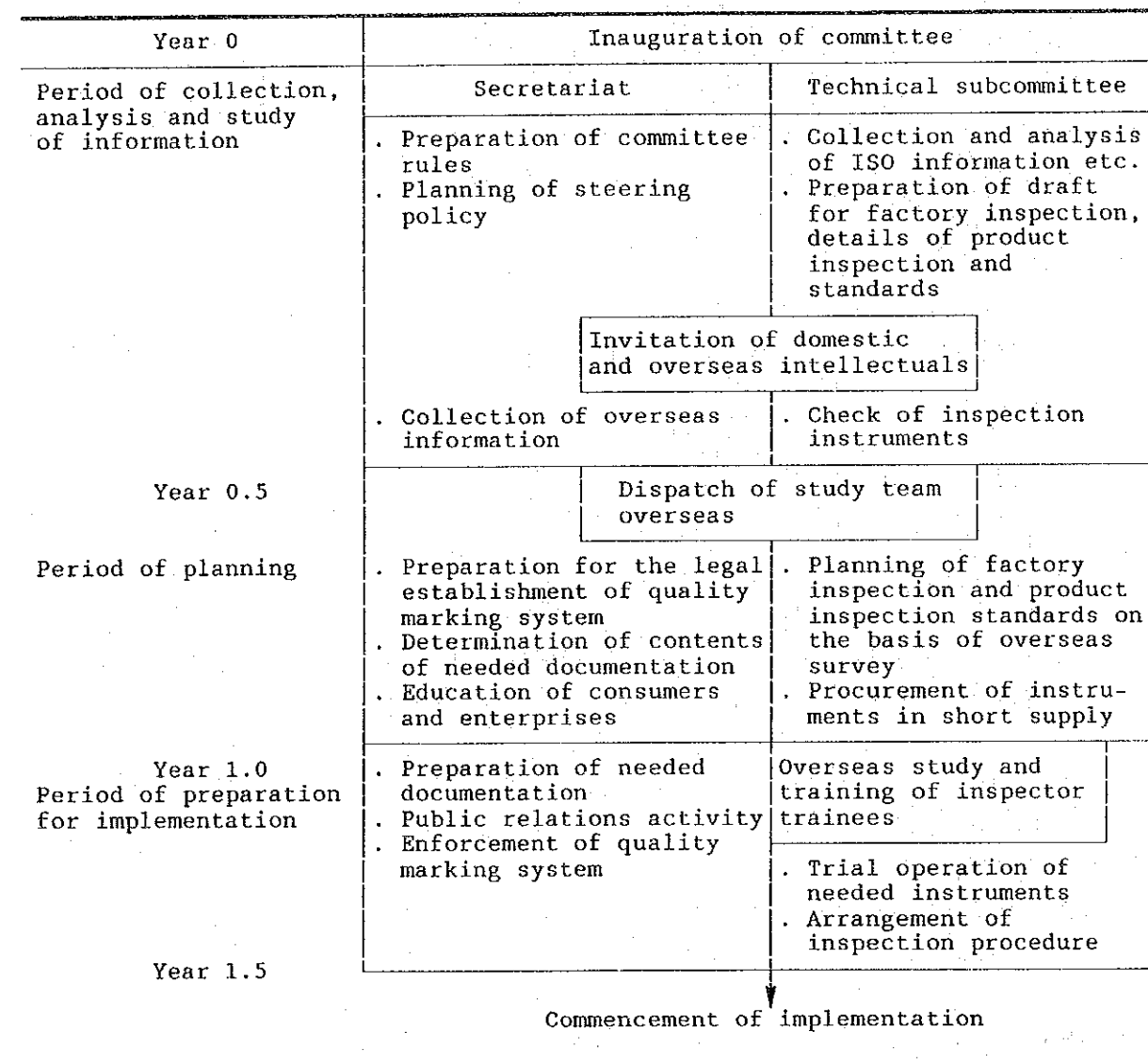


Fig. III-4-1 Flow chart of implementation of quality marking system

At the point the quality marking system is institutionalized, the propelling committee is dissolved developmentally to form a quality marking committee which consists of the same members with those of the propelling committee.

2) Institution to inspect and issue quality markings

LATU is the institution most suited to be in charge of inspection and issue of quality marking label in view of the buildings, inspection facilities and scale of inspecting personnel needed, as a result of the field survey. It is thus desirable that the committee and its secretariat be located within LATU. (The alternative of designating PIU, CIV, UNIT, or Centro de Orientacion al Consumidor as the body in charge of promoting the quality marking system was studied and found not to be viable in view of the buildings, facilities and personnel available.)

(3) Steering policy of quality marking committee

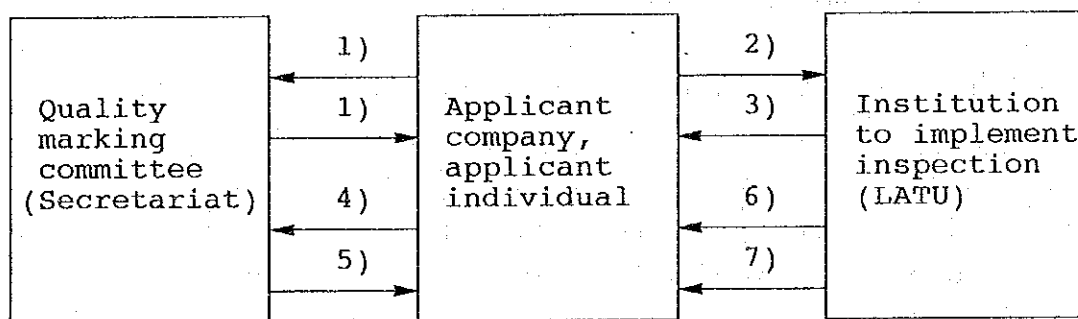
- 1) The committee should inspect factories, in response to applications filed by organizations or individuals who intend to begin use of quality markings, in order to determine whether they are capable of producing products of the designated quality (the accreditation inspection).

Applicants who have been accredited should conclude an agreement with the committee to grant use of the quality marking and pay fees to the committee for its use.

- 2) The applicant should then request LATU to inspect its products based on the agreement granting use of the quality marking.
- 3) LATU should inspect the products and issue inspection certificates.
- 4) Applicants should file applications with the committee for issuance of quality markings together with inspection certificates.
- 5) The committee should issue quality markings in a number corresponding to the number of products inspected as stated

in the pertinent inspection certificates. The committee should collect an appropriate fee for every quality marking issued.

- 6) LATU should inspect products at the time of shipment (sampling inspection).
- 7) LATU should inspect factories of enterprises to whom the use of quality markings has been granted once every year (on-the-spot inspection without warning).



The quality marking committee should finance itself by fees collected for granting the use of quality markings and fees for the issuance of quality marking label. LATU should inspect products and issue quality marking labels under the contract with the quality marking committee. The initial capital investment should be financed by appropriation in the state budget.

- (4) Equipment needed for the enforcement of quality labeling system

Equipment needed for the enforcement of a quality labeling system is shown in Table III-4-2. They are classified into items owned by LATU and ones to be newly procured.

Inspection equipment which may be needed for the processing of filed claims is also included.



Total price of equipment to be procured is about US\$165,000 on the basis of ex-work in Japan.

The marked composition shall be analyzed by way of chemical analysis. Existing analytical instruments owned by LATU shall be used for the analysis. The one personal computer needed shall be the one that currently exists. It is therefore excluded from Table III-4-2.

Table III-4-2 Equipment needed for the enforcement of quality labeling system

Name of test	Equipment type	Number owned by LATU	Number to be procured
Daylight-fast color	Xenon	0	1
Laundry-fast color	Laundry meter	1	0
	Drying Oven	0	2
	Centrifuges	1	0
Water-fast color	Water Baths	0	1
Sweat-fast color	Perspiration	0	1
Dry cleaning	Dry Cleaning	1	0
Crocking-fast color	Crock Meter	1	1
Sublimation-fast color	Iron Tester	0	1
Tenacity and elongation	Schopper	1	3
Slippage strength	Schopper	1	0
Seam fatigue	Seamed Line Fatigue	0	1
Shrinkage	Press	0	2
	Laundry meter	1	0
	Drying Oven	1	0
	Centrifuges	1	0
Abrasion		1	1
Anti-crease property		1	0
Water repellency	Spray	1	0
Pilling	Pilling	1	2
Flex-rigidity	Softness Tester	0	1
Snagging	Snag Tester	1	2
Shape retention	Thermo-hygrostat		
Labeling		0	1

(5) Approximate cost of implementing quality labeling system

The approximate monthly cost is calculated based on the following assumptions.

- Number of quality labels issued : 4,000/day
- Number of personnel required : 5
- Average personnel cost : US\$ 300/month/capita
- Electricity charge : US\$ 0.07/kWh
- Boiler (20kg steam/h) fuel oil charge : US\$ 0.29/l
- Boiler (20kg steam/h) fuel oil consumption : 4.0 l/h
- Exchange rate : Yen 125/US\$

[Unit : US\$/month]

1) Personnel cost (5 X US\$ 300/month/capita, including social security charge)	1,500
2) Electricity charge (150kW X 8h/day X 25 days/month X US\$ 0.07/kWh)	2,100
3) Fuel oil for steam generation (4l/h X 8h/day X 25 days/month X US\$ 0.29/l)	230
4) Consumables (labeling tape, ink, detergent, test cloth and so on)	400
5) Literature (ISO, ASTM and so on)	80
6) Amortization (amortized over 7 years, Yen 20,644,000 X 0.28/12 = Yen 500,000)	4,000
7) Miscellaneous (10% of 1) - 6) above)	700
Total	US\$ 9,250

Monthly expenses less amortization are US\$ 5,250, thus cost per quality label based thereon is US\$ 0.05.

The following items such as delegation fee of expert, expenses for person in charge of Ministry of Industry, taxes etc. are excluded in the above figure.

(6) Business of Quality Labeling Department, Textile Garment Section

The following is an outline of the business to be carried out by the Quality Labeling Department, Textile Garment Section to be established within LATU.

1) Organization

Section manager - 1, technician - 3, clerk - 1, total - 5

2) Job assignment

Section manager - Overall management

Clerk - (Accounting, reception of test applications, issue of labels, etc.)

Technician : Execution of the following tests

(1) Coat, trousers, sweater, cardigan, blouse, jacket, etc.

Tests required for quality labeling including composition analysis, washing and so on (laundering, chlorine bleaching, ironing, dry cleaning, tumble drying)

(2) Curtain, blanket, sheet, pillow cover, etc.

Test of shrinkage, fire resistance and dimensions in addition to the tests above.

In Japan, these tests are carried out in compliance with the JIS standard described below. Tests in Uruguay should be carried out in compliance with the corresponding ISO standard. Numbers in brackets denote the ISO numbers corresponding to JIS.

Test of fiber composition

: JIS L-1030 (ISO-1833, ISO-5088)

Shrinkage test

: JIS L-1042 (ISO-675, ISO-3175)

Handling test including washing

: JIS L-0217 (ISO-3758)

Fire resistance test

: JIS L-1091 (ISO-6925, ISO-6940)

Dimension test

: JIS L-4001 - 5 (ISO-3638, ISO-3635, ISO-3636,  
ISO-4415, ISO-3637, ISO-4416)

Furthermore, spring coats and raincoats are subject to the water repellency test L-1092 (ISO 811, ISO 4920).

## 4-2 Implementation of Cooperative Efforts

### 4-2-1 Significance of the implementation of cooperative efforts

- (1) Export oriented Uruguayan garment enterprises must establish systems capable of producing wide varieties of such high value added products as the international marketplace demands, in small lots within a short period of time. Thus expensive high technology equipment must be procured. Few Uruguayan garment enterprises already have high technology equipment, and most of them may not have the financial resources to acquire it. Joint procurement and joint use by as many enterprises as practical would offer an opportunity to get around this obstacle.
- (2) Most Uruguayan garment makers are of a relatively small scale. These small scale enterprises may not be able to afford their own sponging processing plants as needed to stabilize the shrinkage of textiles, or jeans washing plants, due to the likely low rate of utilization. Joint construction and joint use by as many businesses as practical would serve to increase the rate of plant utilization, while the costs of plant construction and operation could be shared by all participating enterprises.
- (3) The labor and man-hour costs borne by individual enterprises can be reduced by joint procurement, storage and dispatch of materials and subsidiary materials.
- (4) Concentrating libraries of various information materials at UTU or CDI for joint utilization would allow greater access to information, including not only data on world fashion trends, market trends and state-of-the-art technology and equipment, but also worldwide textile and garment statistics.

#### 4-2-2 Forms and examples of cooperative efforts

##### (1) Cooperative efforts which require no additional facilities

###### 1) Joint procurement of materials, subsidiary materials and so on.

If five companies, A, B, C, D, and E, procure the same textiles or yarn, they could cooperate by taking turns at being in charge of procurement for all five. The company in charge of procurement one month, for example company A, would sum up the quantities required by all five companies and negotiate, conclude contracts with the relevant vendors, procure and dispatch those materials. The other four companies would be able to save the time and labor required for procurement that month. There would also be a chance to gain quantity discounts.

###### 2) Joint survey of overseas markets

Certain Uruguayan garment enterprises may be able to independently survey overseas markets when their executives go overseas 2 - 3 times a year, but many small scale enterprises do not have such an opportunity. These small scale enterprises may be able to join together to share the cost of nominating member enterprises to survey overseas markets in rotation, sharing the information so collected in order to cope with short cycle trends in the worldwide garment market. Alternatively, they may be able to jointly hire an overseas market survey institution to prepare a market survey report accessible to all participating enterprises.

###### 3) Joint sales

Small scale enterprises which find it difficult to participate in overseas fashion shows and overseas fashion fairs by themselves may be able to participate in those

fashion shows and fairs through joint sales representation.

4) Joint development and employment of merchandisers and operators

Joint development and employment of merchandisers and operators is recommended for small scale enterprises which need such people irrespective of their small size.

5) Advantages and disadvantages

(1) Advantages

The advantages of this kind of cooperative effort are reduction of investment and cost, and implementation within a relatively short period of time.

(2) Disadvantages

Unless the joint organization to be established is fully discussed in advance so that its significance is mutually understood by participating enterprises, the organization may disintegrate. An appropriate rule should be made for avoiding a leak of secret information possessed by enterprises.

(2) Cooperation in the form of one enterprise providing processing for a fee to others

1) Form of operation

Under this scheme, a sponging processing plant, for example, would be constructed by a nominated large scale enterprise, and provide processing to other enterprises at a fee.

## 2) Advantages and disadvantages

Advantages and disadvantages are discussed relative to the provision of the same kind and extent of services by a jointly established and operated plant, as described below.

### (1) Advantages

- (a) Enterprises except for the one building the plant do not have to provide investment funds.
- (b) Because a single company is responsible for the management of the plant, decisions concerning management policies and processing fees can be made quickly. Such decisions may be delayed in the case of a jointly operated plant.

### (2) Disadvantages

- (a) The plant would be run in order to generate profits from commissioned processing. Processing fees may be higher than those charged by a jointly operated plant.
- (b) Even if the processing capacity and extent of services offered are the same as those provided by a jointly operated plant, the enterprise which manages the plant may give priority to the processing of its own products, so that the services available by commission to other enterprises may be limited, and delivery of their processed products may be delayed.
- (c) If relations with the managing enterprise deteriorate, service may be refused.
- (d) The plant may suffer from a loss of clients in the future.



(3) Cooperation in the form of joint operations

- 1) This type of cooperation involves the establishment of a joint corporation to build and manage a facility such as a washing plant. Participating enterprises needing to use the facility would share the investment required.
- 2) Facilities which may be operated jointly

The following facilities may be operated jointly.

- (1) Plant equipped with CAD or CAD/CAM
- (2) Sponging plant
- (3) Jeans stone/chemical washing plant
- (4) Finish pressing plant

3) Advantages and disadvantages

(1) Advantages

- (a) A large investment may be shared by participating enterprises.
- (b) Participating enterprises may be able to secure processing at less cost than would be charged by a plant managed by a nominated enterprise as discussed in item (2) above.

(2) Disadvantages

- (a) Participating enterprises are required to raise capital funds.
- (b) The corporation would be jointly managed by plural enterprises and thus corporate management decisions may likely be delayed.

#### 4-2-3 Steps to be followed for the implementation of cooperative efforts

##### (1) Cooperative undertaking project team

###### 1) Members of project team

PIU and CIV should be the sponsors that nominate the cooperative undertaking project team by requesting the participation of garment and knitwear companies and the Asociacion de Industrias Textiles del Uruguay under the support of the Ministry of Industry and the Ministry of Economy and Finance. (Businesses operating in the free zone should also participate if the cooperative undertaking takes place within the private sector free zone of Montevideo.)

###### 2) Business of the project team

- a) The project team should seek to comprehend the actual state of affairs through the distribution and collection of questionnaires concerning individual companies' methods of purchasing clothes, yarn and auxiliary materials, storage, packaging and distribution. Hearings should be held concurrently to air the opinions of individual companies on the joint use of high technology production machines including CAD/CAM systems, joint storage and use of materials and auxiliary materials, joint use of plant and equipment, joint transport and distribution, joint merchandising, joint sponging, joint washing of jeans and so on.
- b) The project team should summarize the advantages and disadvantages of the cooperative undertaking and classify it into either the short-term, medium-term or long-term category.
- c) The project team should prepare a preliminary study report with respect to the form, scale and substance of the cooperative undertaking.

### 3) Contents of questionnaire survey

By dividing the questionnaire survey into a survey of the actual status of individual enterprises and a survey of the intentions of individual enterprises, results obtained would be more easily analyzed. The following is one of examples of questionnaire.

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#### QUESTIONNAIRE SURVEY WITH RESPECT TO INTER-ENTERPRISE COOPERATION (DRAFT)

##### A. Survey of actual status (Results of previous year)

##### 1. Purchases by your enterprise

(1) Purchases by yourself (Component ratio %)

(2) Purveyance by client (Component ratio %)

Material, subsidiary material	Type of packing	Unit	Annual purchase	Minimum quantity /month	Maximum quantity /month	Number of vendors

##### 2. Inventory of your enterprise

Material storage section	Space m <sup>2</sup>	Principal inventory items	Occupancy of storage space

Remarks : Please report any leased storage space as well.

(to be continued)

(continued)

3. Product shipments by your enterprise

Classification	Yourself /commissioned	Number of operators	Working space m2	Minimum quantity /month	Maximum quantity /month
Packaging operation					
Dispatch operation					

B. Survey of intentions

Please circle those items concerning inter-enterprise cooperation which are closest to your intentions.

. Joint collection and use of information concerning markets, fashion and techniques

- Extremely necessary      - Necessary      - Not necessary

. Joint procurement and storage of materials, subsidiary materials

- Extremely necessary      - Necessary      - Not necessary

. Joint dispatch of products

- Extremely necessary      - Necessary      - Not necessary

. Joint use of high technology equipment including CAD/CAM

- Extremely necessary      - Necessary      - Not necessary

(to be continued)

(continued)

. Joint finishing plant

- Extremely necessary      - Necessary      - Not necessary

. Joint sponging plant

- Extremely necessary      - Necessary      - Not necessary

. Joint washing plant

- Extremely necessary      - Necessary      - Not necessary

. Any other joint operations

. Opinion concerning inter-enterprise cooperation

(the end)

---

#### 4) Contents of preliminary study report

(1) Method and analysis of the results of the questionnaire survey

(2) Cooperative projects which are considered feasible shall be extracted. Advantages and disadvantages of each project so extracted, if implemented, shall be contemplated. Measures to alleviate disadvantages shall be studied.

(3) Those cooperative projects which are considered to have significant advantages, and whose disadvantages, if any,

can be overcome shall be confirmed for implementation.

(2) Committee in charge of promoting inter-enterprise cooperation

The objective of the committee in charge of promoting inter-enterprise cooperation is to carry out feasibility study of the projects confirmed for implementation by the preliminary study report. The organization and business of the committee are as follows.

1) Organization

The committee should be established by expanding and reinforcing the cooperative undertaking project team. A steering subcommittee, construction subcommittee, technology and facility subcommittee, purchase and storage subcommittee, transport subcommittee, information and sales subcommittee and so on should be appointed under the committee.

2) Business of steering subcommittee

- a) To convene committee meetings and subcommittee meetings (e.g. weekly subcommittee meetings and monthly committee meetings)

To discuss and plan funding of committee and subcommittee activities

- b) To study methods of operating the cooperative undertaking (to plan fees for participation in the cooperative undertaking by individual enterprises, annual membership fees, commissions for usage, revenues including aid from the government, and costs of operation and so on)
- c) To prepare a cooperative undertaking feasibility study report on the basis of the reports prepared by subcommittees
- d) To prepare management rules applicable to the corporation to be established for implementation of the cooperative

undertaking

e) To study any other items as needed

3) Business of construction subcommittee

a) To select site for the corporation in charge of cooperative undertaking on the basis of the report prepared by the project team, and to plan construction program for factories, warehouses, etc.

b) To study method of funding.

c) To study any other items as needed.

4) Business of technology and facility subcommittee

a) To select high technology machines as needed for small lot, diverse variety and high value added production.

b) To sum up the costs of acquiring and operating high technology production machines.

c) To sum up the costs of acquiring and operating plant and equipment which can be used jointly.

d) To study methods of educating and training high technology production machine operators. (The guidance of LATU or expatriate specialists should be enlisted to begin with.)

e) To plan usage fees.

f) To study any other items as needed.

5) Business of purchase and storage subcommittee

a) To study methods of joint purchase of materials and auxiliary materials, and methods of joint storage (including control of