INTEGRATION OF THE QUALITY, ENVIRONMENT AND SAFETY MANAGEMENT

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INNOREGIO: dissemination of innovation and knowledge management techniques

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“INTEGRATION OF THE QUALITY, ENVIRONMENT AND SAFETY MANAGEMENT”

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1. DESCRIPTION

1.1. INTEGRATION OF THE QUALITY, ENVIRONMENT AND SAFETY MANAGEMENT: WHAT IS THAT?

In this document the Innovation Management Tool called “Integrated Management of Quality, Environment and Safety”.

Owing to social awareness, market demands and the need to project looking forward to future times, improvement and innovation, many companies in our environment are in a changing process of the managing performance:

- Introducing quality management systems.
- Putting into practice clean technologies and correcting steps in order to minimize and control the impacts coming from their industrial activity.
- Developing activities related with the Industrial Hazard Prevention.

On these grounds it is clear that there is a need to work out a methodology enabling the development of the activities related to Quality, Occupational Hazard Prevention and Environment in a more systematized way and at the same time more integrated in the management sphere, thus enabling the introduction of continuous improvement in the management behaviour of the small and medium size companies (SME) not only as an ethical obligation towards society but also as an essential competitive weapon in a type of market that already is bearing in mind the quality-environment-safety as a distinguishing argument.

However, to carry out good management practices turns out to be difficult owing to the limited resources available to the SMEs and micro SMEs for the investment in ideas and management tools, so that the development of this tool and this methodology, i.e. the Integrated Management of Quality, Environment and Occupational Hazard Prevention, is decisive for these companies in order to achieve a competitive position in the market.

It is apparent that to add any of these factors (quality, environment, safety) to the management model can be done in different ways, the most appropriate one being that of **integration**. In such a way optimization of available resources and to ground the management of the company on the same principle can be achieved.

Through integration Quality, Environment and Safety management is approached from an homogeneous and coherent point of view. This integration is achieved by means of the introduction of a methodology as described in this document implying a series of steps to be done along the time, such as: information and explanation of the methodology in the companies, training of monitors or coaches in them, development of

documents and putting into practice of the particular methodology, audit of the system and the possible certification.

The tool to be presented hereafter describes the integration and assistance methodology to carry it on. Finally it also provides a guided analysis of this management in order to start a series of innovating actions leading to the improvement of the Organization's processes and products.

1.2. AIMS

The **general aims** of the methodology and the tool for the Quality, Environment and Safety Management are:

- to introduce a methodology allowing the SMEs to have access to a minimum management.

- to allow the SME to be able to abide by the legislation affecting them with regard to environmental and safety matters.

- to overcome the difficulties originated by the scarcity of the SME's management resources trying to develop suggestions and proposals for the conditioning, organization and activation of structures above individual companies allowing them to share resources for the spheres of quality, environment and occupational hazard prevention management within the same local or sector environment.

- To assist the SMEs to develop the documentary management of these systems as well as their introduction and putting into practice, since in the majority of cases it happens to overflow them. On the other hand, also to relieve them by means sectorial actions of those loads having to do with action in the fields of training and information.

The **final aim** to be achieved is in short to **put into practice** in the SMEs and in the microSMEs a management system that making use of the multiple synergies existing in the spheres of Quality, Occupational Hazard Prevention and in the Environment satisfy the integration into the three systematics, simplifying at the same time the documents, thus granting the possibility of certification with regard to the ISO 9000, ISO 14000, R1836/93, UNE EN 81900 ex (Spain, Occupational Hazard Prevention) standards.

As a last resort, the development of this methodology and the application of the management tool for the Quality, Environment and Safety aim at enabling the **analysis, study and diagnosis** of the situation of the Organization with regard to the management of these resources and the **adoption** of a series of steps and **innovating actions** that will lead to the improvement of the processes and products offered by the Organization.

1.3. METHODOLOGY OF IMPLEMENTATION; ALTERNATIVE TECHNIQUES

IMPLEMENTATION METHODOLOGY. ANALYSIS – DIAGNOSIS - PLAN

Quality Systems, Environment Management and Occupational Hazard Prevention should make the company more efficient and having a better earnings performance. Therefore, the different systems should

- be compatibles with each other,
- be able to be managed in an efficient way,
- not have contradictory aims.

In order to make management in these three spheres be systematic and standard so that it may be credited in front of third parts, during the few past years a series of regulations and standards for the standardization and certification of management systems in the Quality, Environment and Occupational Hazard Prevention areas have been independently issued:

- **Quality Assurance:**

At an international level there are the **ISO 9000 standards** which have been increasingly demanded and for which there are highly developed introduction methodologies to put them into practice.

- **Environment:**

At European level, the EEC Ecomanagement and Ecoaudit (R.1836/93) Regulations have been developed so that the organizations join voluntarily a communitary environmental management and audit system. The **ISO 1400** standard for Environment Management Systems (SGMA) is nowadays a compulsory reference for those companies wishing to achieve certification in this matter.

- **Occupational Hazard Prevention:**

On signing the Single European Act (SEA), the EEC member Estates pledged to further bettering of the working place environment harmonizing development of the health and safety conditions of the workers. A series of Rules to that effect has been enacted, one of the most important ones being the EEC-Frame Guideline 98/391/EEC to take steps for furthering the betterment of the safety and health of the workers in their work-places, the transposition of which onto the Spanish legislation gives rise to the Occupational Hazard Prevention Law (i.e.: Work Risks Prevention Law) 31/1995.

Due to the coming of that law into force and to the development of the management systems, the standardization institutions have been obliged to work out standards for the development of certifiable Management Systems for the Prevention of Occupational Hazards. Up to now an Experimental Standard (not certifiable)**UNE**

81900, parallel and in harmony with the ISO 9000 and ISO 14000 standards has been developed.

As may be remarked, there is a rather wide legal and regulating frame for these management systems. Although each of the standards and regulations described above embraces independently Quality, Environment and Safety, there is a sort of consistency that holds along all of them thus enabling their satisfactory integration.

The table hereunder shows in short the main aspects of the standards holding consistency or coherence with each other:

RELATIONSHIP AMONG THE ISO 9000, ISO 14000 AND UNE 81900 STANDARDS

ASPECTS OF THE STANDARDS	**ISO 9000**	**ISO 14000**	**UNE 81900**
REGULATES RELATIONSHIPS BETWEEN DEMANDS	Customer – Consumer	• Customer-consumer • Public Administration • Environmental Organizations • Community	• Work force • Public Administration • Environmental Organizations • Community (indirectly)
DEMANDS	Contract –Standard	• Contract-Standard • Legislation • Regulations • International Agree	• Contract-Convention • Legislation • Regulations • Guidelines
GOALS	• Fulfilment of technical requirements • Continuous improvement	• Abiding by laws • Steady bettering (continuous improvement)	• Fulfilment of requirements • Continuous improvement
AIMS	**Requirements of**	**Environment Excellency**	**Prevention of**
	"Zero Defects" Standard	**"Zero waste or refuse"**	**Risks "Zero accidents"**

The methodology for the introduction and putting into practice of an Integrated Management System roots in the principle of "Initial Analysis of the Situation" / Diagnosis / Plan", and is detached or broken down in four basic steps:

1. Integrated Assessment of the Initial Situation
2. Performance Programme
3. System Introduction
4. Audit

1.3.1. Integrated Assessment of the Initial Situation

The aim is to take an initial photograph of the company management showing the aspects given in detail hereunder. However, the company may not chose all the "colours" on the picture, something that would lead to focus the improvements on a part of the aspects to be bettered in stead of doing it on the whole picture.

A/Diagnosis

The aim here is to obtain the minimum knowledge on the company management from the point of view of the quality, environment and safety. It includes three different sections:

- **Situation of all three systems:** The aim is to check the management tools available to the company; procedures, instructions, etc., concerning quality, environmental and safety matters in order to ascertain in which

condition they are and take them (if there are any) as the groundwork or basis for the integrated management system.

This analysis is made following the check-list provided herewith that shall be used in accordance with the description given in **Annex I**: "**Checking the Quality, Environment and Safety Management Systems"**.

- **Degree of Regulations Fulfilment:** Owing to the legal implications of the Environment Management and of the Occupational Hazard Prevention Management, it is necessary to find out which requirements are to be fulfilled and which their degree of fulfilment is.

  This analysis is made following the tool the employment of which is described in **Annex I: "Checking the Quality, Environment and Safety Management Systems".**

- **Knowledge of the environment conditioned complaints:** It includes the detection of the main environmental aspects affecting the company in the following matters:

  - Waters
  - Atmosphere
  - Noises and vibrations
  - Waste and refuse
  - Soils
  - Impact on the scenery and on the ecological systems

B/Environmental Assessment

It deepens in the knowledge of the company processes from the environmental point of view (energy, waters, raw materials, etc.).

The Environmental Assessment is a necessary document carried out by competent staff containing following aspects:

- Process diagrams: for the knowledge of the processes from the environmental point of view it is indispensable the availability of process flow diagrams as well as of ground plant drawings of the material movement for each process in order to examine them carefully from the logistical point of view.
- Environmental aspects in the processes on the different flow diagrams; the following inputs and outputs of each process should be given qualitatively in detail and, when possible, quantitatively :

  - Raw materials and auxiliaries
  - Energy and energetic products
  - Clean and waste waters (sewage)
  - Air, gas and atmospheric emissions

- Products and refuse

- Balances: Materials, waters, process energy and product balances are to be carried out in order to detect critical points from the environmental point of view and try to design a mathematical model of the processes that would provide us with future management thereof
- Ratios: With the consumption figures obtained from the above points it is advisable to define process and product ratios relating production to the raw material, water, energy consumption figures and to the amount of refuse produced so that they serve as environmental indicators.

C/Occupational Hazards Assessment

Accident risks are classified on the one hand in work-place inherent dangers, and on the other hand as dangers coming from the features of the work-equipment being used:

- Work-place danger assessment: the following dangers are to be evaluated: dangers to the health, and ergonomic and psychosocial dangers inherent to a particular work or job.

- Diagnosis of machines and work equipment: dangers and safety problems that this equipment may represent for the workers are assessed.

1.3.2. Performance Programming

The same as in any management programme or planning, performance includes the following aspects:

- Actions to be carried out and in which order
- Needed means and resources to carry them out
- Indicators of the actual situation now and goals to be reached in each action
- Starting day and finishing day

For the design of the Performance Plan in Integrated Management the tool called “Innovation Action Plan” in **Annex II: Performance Programming Tool”** is offered. To follow it will help get a series of actions in time.

With regard to the order in which the actions should take place, the following blocks should be distinguished:

- **Integrated actions for the introduction of the systems:** how to work out all documents common to all three systems that may be developed together from the beginning (Handbook, procedures, instructions and records), or being added to a first document, which usually happens to be

one referring to quality is given in detail. Two types of procedures are distinguished:

A/Key procedures for the system:
- Working out and control of procedures
- Records
- Complaints, claims, suggestions and non-conformities
- Non-conformities and correcting actions

B/Remaining procedures common to more than one system.

- **Actions concerning Quality matters:** they include two aspects: working out the specific documents concerning quality matters and the improving actions.

The specific documents concerning quality are the following procedures:

- Identification and traceability
- Process control
- Inspection and reception, process and final tests
- Inspection and test condition
- Post-sale service
- Statistical techniques

- **Actions in environmental matters:** they include two aspects**:** working out the specific documents and improvement actions.

Hereunder the specific environmental documents:

- Environmental control and improvement of the processes
- Control and improvement in atmospheric matters
- Control and improvement in water concerning matters
- Control and improvement in waste and refuse matters
- Control and improvement of other aspects (noises, vibrations, soils, visual impact, in the ecological systems, energy consumption and raw materials, etc.)

The betterment actions may be these:

- Cleaning and selective collection of waste and refuse
- Efficiency improvement in the use of raw and auxiliary materials
- Waste and refuse lowering
- Efficiency and energetic saving
- Efficiency and water saving
- Staff motivation in environmental matters

- Environmental improvement of processes
- Environmental improvement of products
- Minimization of the use and production of containers

- **Actions in Safety and Danger Prevention matters:** they include two aspects: working out the specific documents and the improving actions.

The specific safety documents involve the following procedures:

- Risk assessment methods
- Selection and use of *EPIs*
- Investigation of accidents and incidents
- Health watch and control

The actions towards bettering may be:

- Cleaning and health
- Staff motivation in Safety matters
- Process safety improvement
- Safety improvement of manufactured and bought products

1.3.3. System Introduction

It is very advisable to introduce an integrated management system in groups of companies having similar features through the use of guiding methods and tools adapted to each of the sectors involved.

The following actions might be used to further this introduction:

1. Awareness raise

An informal talk or lecture given to the managing team and executives of the company stressing their responsibility in management with the aim at motivating the leaders towards the advantages of integration.

2. **Methodological training**

It is divided in five blocks corresponding to document groups to be worked out in the system:

- Key documents
- Documents common to all three systems
- Specific documents in quality matters
- Specific documents in environmental matters
- Specific documents in safety matters

Documents with regard to emergency plans may be included in any of the two last blocks.

3. Dynamics of the introduction

What is meant is to drive the working out of documents and the introduction of all procedures, methods, instructions and records constituting the Integrated Management system.

1.3.4. Audits

An audit consists in periodically following the evolution of the management system in the company, setting indicators and goals by means of previously established assessment systems.

This audit or follow-up of the evolution of the system or of its introduction can be carried out using the tool of this project, i.e. the check-list in which the estate of the Quality, Environment and Occupational Hazard Prevention management systems are revised without missing a single point.

DIAGRAMA DE FLUJO

IMPLEMENTATION METHODOLOGY. ANALYSIS – DIAGNOSIS - PLAN

- *Situation of the three systems (**ANNEX I)***
- *Degree of compliance with the regulations **(ANNEX I)***
- *Knowledge of environmental diseases or affections*

DIAGNOSIS ENVIRON. RISK ASSESSMENT AWARENESS ASSESSMENT METHOD TRAINING IMPLEMENT. DYNAMIZ.

Tool 2
ANNEX II

INTEGRATED ASSESSMENT OF INITIAL SITUATION | *PERFORMANCE PROGRAMMING* | *SYSTEM IMPLEMENTATION* | *AUDIT*

Tool 1

Integrated Actions	*Actions concerning Quality*	*Actions concerning Environment*	*Actions concerning Safety*

Documentation Actions	*Documentation Actions*	*Documentation Actions*	*Documentation Actions*

Fig. 2: "Implementation Methodology

ALTERNATIVE TECHNIQUES

The Management Systems environment is undergoing a very quick evolution and it is going forward towards better implantation processes taking a short time introduction. There are many organizations working on the development of new management methodologies , certification of Quality, Environment or Safety systems, as well as in innovating the existing techniques as well as going into them in greater depth.

Hereunder we are describing some of these organizations as well as other management systems, i.e. the alternative techniques to the integration methodology of
Management Systems focusing on the Quality subject, although they may be applied to or integrated into the aspects of Environment and Safety.

A/ Alternative Techniques of Process Management

1. TOTAL QUALITY MANAGEMENT (TQM)

Total Quality is a global strategy embracing the whole organization, mobilizing all the company's resources towards the permanent satisfaction of the customer's expectations. TQM is a theory of business administration offering work methods focusing on the permanent satisfaction target, so that to achieve it is necessary to change the cultural values of the traditional company and to involve the whole staff in a steady effort towards continuous improvement.

The TQU targets are:

- To increase customer satisfaction thus increasing the company's participation in the market.
- To offset or counteract bureaucratic style with a style of continuous improvement and adaptation to change.
- To improve management's efficiency and reduce costs.

The TQM components are Management of Policies, Improvement Equipment and Quality in Daily Work, respect for persons and Planification, Execution, Verificiation and Optimization (PEVO).

2. DEMING PRICE

Deming Price criteria can be used as a guide for excellence achievement in each of the processes in the company at whole organization level. Each area is related to one aspect of the process quality.

The criteria the Deming Price takes into account are the following ones: Strategies, Organization and Management, Training and Diffusion, Collection, Diffusion and Employment of Quality Information, Analysis, Standardization, Control, Make Sure of Quality, Results, Planification.

3. EUROPEAN MODEL OF TOTAL QUALITY MANAGEMENT (EFQM)

This Total Quality Management systems focus on the manager's excellence and offers a general structure of criteria that can be widely applied in any organization or component of an organization.

This model is based on nine criteria serving for the assessment of the organization progress towards business excellence: Customer's satisfaction, Staff satisfaction, Impact improvement on society, Leadership initiatives, Staff management, Company resources, Company policy and strategy, Company processes, Business Results.

Each of these criteria is divided in subcriteria, that in turn are divided in different areas. The whole structure is represented in a graphic model and in a weighting expressed in percentages of the structure. Both the model and the percentages have been obtained from widespread consultation carried out in European companies by the EFQM, and the percentages are yearly revised as a part of the continuous improvement process.

4. REINGENEERING OF THE BUSINESS PROCESSES

Nowadays companies must face steadily changing market conditions such as customers and competitors. These changes happen outside the reach of their expectations and can let them fail if they are not capable of adapting to this new atmosphere.

Business Process Reingeneering (BPR) may be defined saying that it is "**the fundamental revision and radical redesigning of processes in order to achieve spectacular improvements in contemporary and critical yield or returns measurements such as costs, quality, service and quickness."**

Depending on the present situation of the company and on the improvement aims established by the company, the necessary change will be drastic, an increasing improvement or will be on an intermediate level. Although between 50% and 70% of the companies starting the reingeneering process do not achieve the expected results, it may be said that those facing it successfully achieve improvements which would have hardly been otherwise attained.

B/ Organizations Working in the Field of Quality, Environment or Safety Management

1. ISO

ISO is the international organization for standardization the aim of which is to foster standard development, test execution and certification in order to encourage trade both of services and commodities. The organization has been constituted by representatives of 91 countries.

2. EUSKALIT: BASQUE QUALITY FOUNDATION

EUSKALIT offers an external assessment service free of charge following the EFQM model. Besides it works for the diffusion, promotion and training of quality management. Its experience is based on big companies, service and industrial SMEs, consultant companies, education centres and the Basque Health Service (Osakididetza).

3. AENOR

Aenor, a non-profit private institution, has been recognised by the Industry and Energy Ministry (Order of February 26th, 1986) to work out certification and standardization tasks in the field of the structure of Quality, Industrial Safety and Environment.

This institution works out Spanish technical standards and is opened to the participation of everybody interested in its work thus pushing forward the Spanish contribution to the development of the European regulations and standards.

In the field of certification, it should be noted the product guarantee certification (UNE EN ISO 9001, 1003 AND 9003) of special importance in the automobile industry. It also certifies Environment Management Systems (ISO 14001 and R1836 EMAS). It has also Publication and Training services.

There are besides **other organizations** working both in the certification field and in the field of training and publication of matters related with management systems. The following ones may be listed in alphabetical order:

AQR- Assessment & Quality Register
BVSI Quality Services
Bureau Veritas Quality International
Entidad de Certificación y aseguramiento, S.A (Insurance and Certification Institutution).
Det Norske Veritas
European Quality Assurance
Fundación Calitax para el Fomento y Control de la Calidad (Calitax Foundation for the Promotion and Control of Quality)

Germanischer Lloyd Certification GmbH
ICICT, S.A.
Instituto Valenciano de Certificación (Valencian Certification Institute)
Lloyd's Register Quality Assurance
Quality Management System
ASGS ICS Ibérica AEIE
Tüv Management Service

1.4 EXPECTED BENEFITS

The application of this technique will enable the Organization to achieve a certain degree of technological innovation from the point of view of the Quality, Environment and Safety Management that will be distinguished by the following features:

- It will have a first approach towards the ISO standards for Quality, Environment and Safety Management thus coming to roughly know their requirements and specifications. Further on it will enable the company to carry out the certifiable management system in any of this three standards for a series of Organizations in which there is scarcely either any experience of this type nor the possibility to overcome the difficulties brought about by the scarcity of management resources at their disposal.

- The integration of the safety and environmental management in the quality management is one of the few opportunities for this type of company to approach in a systematic and rational way both types of management in stead of just reacting to government requirements.

- To know by means of a simple technique applied by the Organization itself in which condition its Management System is and which its needs, strengths and weaknesses are.

- To overlook all three systems from the same point of view making integration in time much easier.

- To know whither you can go, i.e. whom or where to resort to, in order to better your management.

- To work out a series of specific actions to better management within the Organization.
  Through the thorough examination of the Organization from the point of view of Quality, Environment and Safety, a series of actions spread throughout all areas of the company will be worked out. These actions will make possible to improve management, processes, products, the relationship with the environment and all other relevant aspects, thus offering the Organization a diagnosis of its own situation and an innovation strategy.

In the different areas of which the Organization is composed, benefits deriving from integration are put in short in the following table:

BENEFITS FROM THE INTEGRATED MANAGEMENT SYSTEM	
OF THE ASPECT ORGNIZATION	EXPECTED BENEFIT
LEGAL	• It saves fines and sanctions • It saves lawsuits • It saves legal expenses • It lowers danger of business and criminal liabilities • It saves possible lawsuits for predatory or unfair competition
INVESTMENTS AND COSTS	• It optimizes investments and costs • It makes access to economic assistance easier • It lowers costs derived from lack of management • It avoids wrong market reactions • It lowers the danger of incurring in costs due to outsiders carrying actions out in our organization • It lowers insurance premiums
PRODUCTION	• It allows production process optimization • It optimizes introducing new technologies • It enables reduction of production costs
MANAGEMENT	• It integrates environment and safety management into overall management • It increases management's trust among workers • It furthers participation on all levels • It strengthens and completes other systems
FINANCE	• It increases the trust and confidence of the public administration, the shareholders and the insurance companies • It lowers the risks leading from taking on responsibilities or accountabilities of previous owners
TRADING, MARKETING,	• It enables the adaptation to possible market demands • It can make easier to increase

MERCHANDISING	market share • It enables to take part in new business opportunities and development of technologies and products
IMAGE	• It improves the inner and outer image of the company • It makes integration into social environment easier • Credibility between interested parties.

1.5. CHARACTERISTICS OF THE COMPANY THAT SUPPLIES THE TOOL

The development and implementation of a tool having these features implies that the work will be carried out by experienced and specialised people as well as the intervention of support of an organization.

So, with regard to the characteristic features or the profile required to work out and put into practice a methodology of Integration of Quality, Environment and Safety Management, two different aspects are to be distinguished: the consultant's profile and the characteristic features of the organization.

1.5.1. Consultant's Profile

Hereunder skills and abilities characterising a consultant are shown. In this case, we understand that a **consultant** is a person which, belonging to the Organization, is in charge of providing the company with the method for integrating its management, giving the company advise and company during the implementation. It may be a consultant or a **consulting team**. The need that specialised technicians take part in some part of the process (environmental evaluation, knowledge of the environmental diseases or affections, risk assessment, ...) may cause to prefer the option of constituting a consulting team.

The consultant's profile answers to the following characteristics, needs:

1. **Knowledge of Regulations and Legislation:**
He or she should have a sound knowledge and be thoroughly acquainted with the regulation and legal frame to be applied in the company's case.

2. **Professional Skills**

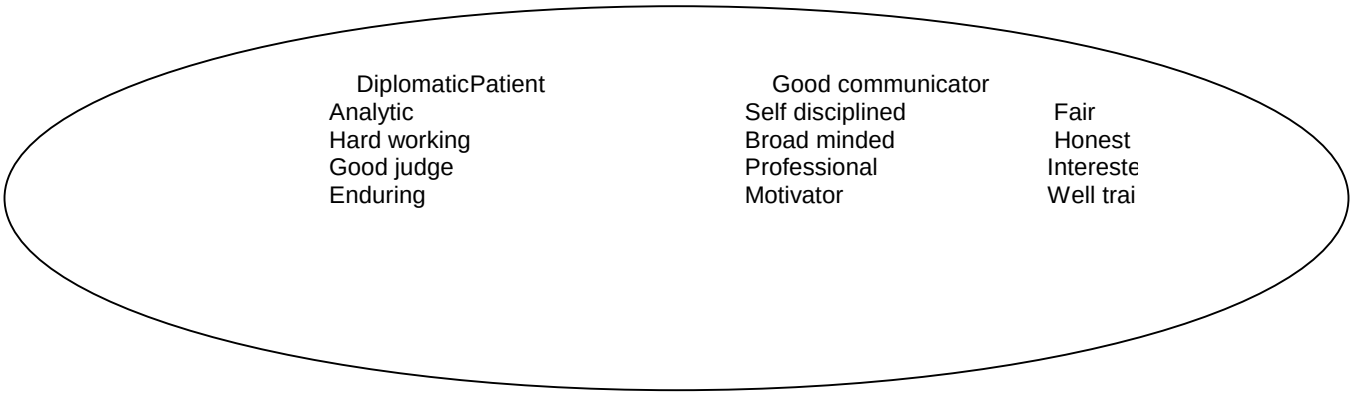
It is important to have previous experience in the field of putting into practice management systems, in the improvement of processes, and project development and leading.
Culture, a technical basis and an specific training in the subjects to be managed are also essential.

3. Social Skills:

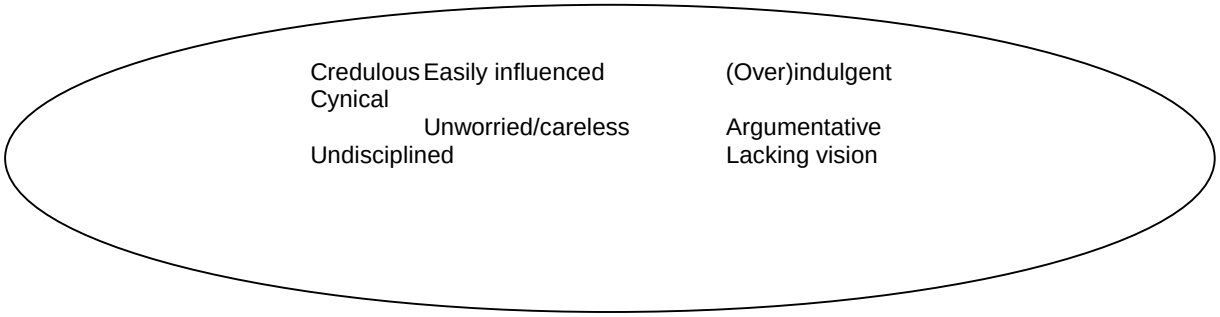
Communicating competency: He or she should be able to establish a communication flow with the staff of the company; very often the consultant shall be the process animator or driver and he or she should be ready to carry it on. Motivator and conciliator.

4. General Behaviour:

To observe the company and its organization, to know how to adapt to it and its environment. To be calm and correct in any circumstances. To be punctual and work seriously. Discretion and professional behaviour as well as flexibility are essential aptitudes on working in other companies where the consultant will have access to knowledge of their processes and staffs.
A really **good** consultant will be characterised by:



A **mediocre** consultant will be in possession of the opposite attributes and besides will be:



Since everybody is in possession of these attributes in some measure or other, a good consultant should be able to examine him or herself and develop his or her good qualities casting the worse ones aside.

1.5.2. Characteristic features of the company providing the service

The Organization providing a service, such as the development and implementation of an Integrated Management System should have in its staff persons being in possession of the aforesaid qualities, aptitudes and skills.

It should be able to guarantee a steady bettering of the methodology it is developing and providing the companies with by means of continuous training of its staff, knowledge of the environment and the innovations *taking place in it, and the supply of the necessary infrastructure.*

2. APPLICATION

2.1. EXPERIENCE IN THE APPLICATION OF THE TECHNIQUE

The introduction of Integrated Management Systems: Quality, Environment and Safety has begun to be used by every type of Organizations, both big and small, as a very good and logical answer to a series of needs exacted by the market, the environment or legislation itself.

As for its application in the small and medium size companies, **experience** has proven that:

- They show great interest in the Integration of Management Systems because they understand that it is the best solution to the existing needs with the available resources.

- The integration is carried out respecting the differences between the Systems due to the fact that the certification is still made separately.

LEIA C.D.T. leads the INSIGE Project within which fifteen companies mainly belonging to the Alavan industrial environment began to introduce Integrated Management Systems in 1997. The employed methodology consists also in "Analysis / Diagnosis / Plan", but in this case, owing the type of company in question (SMEs of rather large size having resources and intending to obtain the threefold certification), Analysis and Diagnosis are carried through in the first step and Plan is given rather more importance.

During the introduction of this action plan there is usually an outside technical advisor working together with the staff appointed by the Organization.

The **degree of technological innovation** underlying the working out of this project has been determined by the following facts:

- The achievement of introducing certifiable Quality and Environment management systems in companies lacking either experience whatsoever in this field or possibilities of overcoming the difficulties arising from almost lacking any management resources.
- The working out of integrated management systems for SMEs in such a way that they have taken advantage of the cohesion existing both in the methodological development and in the management performance of all three systems.
- The integration of the environmental management into the safety one has given an opportunity of approaching this management rationally in stead of just answering to public administration's pulls.

2.2. TYPES OF ORGANIZATIONSCOMPANIES SUITABLE FOR THIS TOOL

Bearing in mind the type of Organizations to be addressed by this work, it is of the utmost importance to work out a simple tool that may be applied with the means and knowledge available in this kind of Organizations, thus enabling improvement starting from the actually existing situation, strongly settling a simple methodology that allows the Organizations to adapt in the future to a more complex Management System if needed.

We are thinking in a type of SME or MicroSME Organization that either has not introduced any Management System or that has worked out some and wishes to have a way to analyse its situation, give its strategy new orientations and carry actions through enabling innovation and, survive and improve in time.

2.3. LENGTH AND COST OF INTRODUCING THE PROJECT

The following chronogram shows how long it will take to carry out the project. It is important to point out to the fact that the tasks of this chronogram are further along explained under point “3.1. Implementation Steps” of this document.

The whole working out of this project (from its presentation and implementation to the audit or final assessment) is carried out in three exercises lasting one year each

Tasks	**Exercise 1 Quarters**				**Exercise 2 Quarters**				**Exercise 3 Quarters**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
TASK I												
TASK II												
TASK III												
TASK IV												
TASK V												
TASK VI												
TASK VII												

The overall estimated cost for the working out of the project is as follows:

Exercise	Concept	Total in Spanish Pesetas
Exercise 1	• Information to the Companies • Summons and project explanation • Training of monitors • Training in the companies • Beginning of the Implementation Methodology	2,525,583
Exercise 2	• Training in the company • Implementation of the Integrated System • Technical assistance	6,000,000
Exercise 3	• Training days • System audit • Conclusions and results analysis	4,155,000

2.4. CONDITIONS FOR THE IMPLEMENTATION: REQUIRED STRUCTURE

The diagnosis of the situation of the Quality, Environment and Safety Management Systems can be made by means of an informatic application designed for carrying out internal audits.

This application can be fitted into only one computer of may be shared by more than one computer connected to a network. In such a case the necessary infrastructure is composed of the following equipments:

Hewlett Packard NetServer E60
Pentium III at 500 Mhz UW SCSI
128 SDRAM
Master disk of 9.1 GM at 7.2000 rpm
9.1 GB Mirroring disk AT 7.2000 rpm
10/100 RY-45 Red Ethernet card
Windows NT Server
SQL Server IIS, installing CDs

Licenses (min. 5 per.)ç
S.O. Windows NT, SQL Server (Customer cd + handbook) and IIS

EGESA PIII 500 Computer
Intel Pentium P III Processor of 500 Mhz (512 kg caché) + CPU Ventilator Dissipator

Q-LITY P3BX PIII Base Plate up to 600 Mhz, Chioset 440 BX AGP inerl
processor
Ultra DMA 8,1 Gb hard disk, IDIE DMA 33 INTEGRATED 2 I/0 PCI, disk drive 3 ½ 1.44 Mb.
128 MB SDRAM2 DIMM Memory with 168 contacts (100 Mhz)
8 MB ATI 3D graphiccard
Minidin 105 PS72 keyboard, 2 button mouse, mat
CD ROM 48x
15" Svga Dig 0,28 monitor
Net 10/100 card

2.5. EUROPEAN ORGANIZATIONS SUPPORTING THE IMPLEMENTATION OF THIS TECHNIQUE

The need to improve and innovate industrial projects and their management is the origin for the great amount of European organizations and administrations supporting the development of this type of techniques.

Among the many existing organizations and assistances the following ones may be underlined:

The European Commission supports the implementation of this methodologies within its INNOVATION programme for the "Promotion of Innovation and Making Participation Ease for the SMEs".

- **MINER (Ministry of Industry and Energy)** fosters a PROMARCO-TIC initiative the aim of which being to work out suggestions for the technological promotion and assimilation of the SMEs

- The same Ministry has promoted the **ATYCA** programme as an initiative for supporting Technology, Quality and Industrial Safety. The ATYCA programme promotes the introduction of Quality and Safety management systems fostering competitiveness of national companies and products.

- **Innovation Plan for Europe** presented by the Commission of the European Union in December 1996 establishing as priority fields:

    - Promoting a true innovation culture
    - Creating a legislative, regulative and financial environment favourable to research.
    - Focus research on innovation

To that end there is the EUREKA initiative focused on the Community R+D Frame Programme.

- **FEDIT, Spanish Federation for Innovation and Technology:** An efficient agent for the optimization of scientific and technological resources

in business and industry. These organizations work on a private and non lucrative basis and contribute actively to the economic and social development furthering Innovation and Technological processes as an strategy to improve competitiveness. They represent a checked and proven Organization model having strong roots in Europe and expanding in Spain. The entities belonging to this Federation can constitute a good support and serve as an orientation for a SMC wishing to put this type of *technology into practice.*

3. IMPLEMENTATION PROJECT

3.1. IMPLEMENTATION STEPS

As has been already explained under "1.3. Implementation Methodology", application of the Integrated Quality, Environment and Occupational Hazards Management tool is carried out in four steps:

The tasks during the time of implementation of this methodology are shown in Fig. 3 "**Flow Diagram of the Implementation Steps of this Methodology"**at the end of this section

1. Integrated Assessment of the initial situation
2. Performance programming
3. System Introduction or implementation
4. Audit

These steps materialize in time, along the time the project lasts, in different phases or tasks, lasting as has been described in the chronogram shown in paragraph "2.3. Length and cost of introducing the project". These phases, the contents of which will be shown in detail further on, are as follows:

TASK I	**Information**
TASK II	**Summons and Project Explanation**
TASK III	**Monitor Training**
TASK IV	**Training in the Companies**
TASK V	**Introduction (Implementation) of the Methodology**

1st TASK I: Information

Different informative talks are organized in order to let the project know, further interest in it, explain and clarify concepts concerning the integration of management systems and motivate the staff to develop it.

2nd TASK II: Summons and Project Explanation

That means to call those organizations that have shown interest in the project, to settle a work schedules, development conditions, and to go on informing on the features of the project.

3rd TASK III: Monitor Training

Before the actual beginning of the project, the necessary members of the staff will be trained in the Quality, Environment and Safety subjects (or the adequate ones will be selected). Persons with proven experience in these fields and knowing well the reality of the small and medium size companies.

4th TASK IV: Training in the Companies

After having got different companies committed to the project and having set up a performance schedule, training of the persons in charge in these companies will begin.
The necessary knowledge in integrated methodology matters will be provided; this sort of training will steadily go on along all exercises subject also to the needs that might be arising.

5th TASK V: Introduction of the Methodology

When this level has been reached, the methodology described in paragraph "1.3. Implementation Methodology" will be applied.

As has already been described previously, the introduction of the methodology will be broken down in four different steps. For each of them the adequate tool will be applied:

3.5.1. Integrated Assessment of the initial situation

The aim here is to obtain an initial photograph or picture of the management of the company showing the aspects quoted hereunder. However, it may happen that the company does not chose all the "colours" shown in the picture, and this would lead to focus the improvements on a portion of the aspects in stead of focusing on the whole picture.

A/Diagnosis

Here to obtain a minimum knowledge of the management of the company from the point of view of quality, environment and safety is intended. It includes three different sections:

- **Situation of the three systems**

  At the beginning the existing situation in all three Management Systems: Quality, Environment and Occupational Hazard Prevention is checked in order to be able to know present estate and condition of the Organization and thus be able to design an Innovation Management Schedule. This Checking will be carried out using the tool called **"Checking the Quality, Environment and Safety Management Systems" ANNEX I.**

- **Degree of Compliance or Fulfilment of the Regulations**

  That means to examine carefully whether the Organization has defined the most important environmental aspects exacting fulfilment of regulations, as well as the aspects of Safety and Occupational Hazard Prevention compliance, with which is also exacted by law. See the tool called **"Checking the Quality, Environment and Safety Management Systems" ANNEX I.**

- **Knowledge of Environment Illnesses**

B/Environmental Assessment

To go into the knowledge of the company processes from the environmental point of view (energy, waters, raw materials, ...)

See section "1.3. Methodology of Introduction or Implementation"

C/Occupational Hazard Assessment

Accident risks are classified on the one hand as work-place inherent ones and on the other hand as risks leading from characteristics of the working equipment in use.

See section "1.3. Methodology of Introduction or Implementation".

3.5.2. Performance Schedule/Programming

As usual in all schedule of management program, performance includes following aspects:

- Actions to be carried out and the order in which they will be carried out
- Necessary means and resources for carrying them out
- Indicators of the actual situation and targets to be reached by each action
- Day on which action will begin and day on which it will end

See section "1.3. Methodology of Introduction or Implementation"

For the design of the Performance Schedule in Integrated Management, the **Tool for Programming Performance**, in **ANNEX II**, is presented. To follow it will help achieve a series of actions in time.

1.1.3. Introduction of the System

It is advisable to introduce an integrated management system in groups of companies having similar characteristics through the use of guiding instruments and tools adapted to each sector in question.

The actions driving this introduction may be the following ones

Awareness Raising

It is important to raise awareness both in the leading staff of the Organization and in everyone involved in the actions.

Methodological Training

It must be decided how to carry it through (documents, procedures) as well to give the necessary training.

Dynamism Raising and Follow-up

To be made in all and every step in which innovating actions be carried out.

See section "1.3. Methodology of Introduction/Implementation"

5.4. Audits

The audit consists of the periodic follow-up of the evolution of the management system in the company fixing indicators and targets by means of assessment systems previously determined.

This audit or follow-up of the systems evolution or its introduction and working out can be done through the use of the tool of this project, i. e. the check-list in which it is go thoroughly through the estate of the Quality, Environment and Occupational Hazard Prevention management systems.

See section "1.3. Methodology of Introduction/Implementation"

HOJAS NUEVAS
26-27 del original castellano
38-39 de la traducción inglesa

DIFFERENT STEPS OF THE METHODOLOGY IMPLEMENTATION

Task 1	*INFORMATION*	*Informal lectures in the Companies* *Explain concepts* *Motivate*
Task II	*SUMMONS AND PROJECT EXPLANATION*	*Involved Organizations* *Work plan* *Conditions*
Task III	*TRAINING OF MONITORS*	*In CA, MA, SE* *In the processes of the companies*

Task IV *TRAINING IN THE COMPANIES*
Persons in charge of the

Project in the companies

Task V *METHODOLOGY INTRODUCTION* *See Fig. 2 "Methodology of Implementation"*

Fig. 3: Steps in the Introduction of the Methodology

3.2. PARTIAL TECHNIQUES AND TOOLS INCLUDED IN EACH STEP

Methods and techniques are explained in each step in paragraph 3.1. with related references to the annexes

3.3. RELATED SOFTWARE (EXISTING OR BEING PREPARED)

It has been foreseen to make use of this tool through an informatic application designed for the carrying out of the diagnosis of situation of the Quality, Environment and Safety management systems as has been specified in section 2.4. "Conditions for the implementation, required structure".

4. LITERATURE

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11th International ISPIM Conference: Theory and Tools for the Innovation Management, 1997.

Papers: "Quality Management and Value Management by Helge Gasthuber

"Value Analysis and Assessment of the Environmental Impact" by M. Carmen Baena Sánchez

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in the Autonomous Basque Community by LABEIN

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"Forum Calidad: gestión empresarial, medio ambiente y metrología". Forum Calidad S.R.L., Madrid, October 1999.

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"5th European Quality Week", EUSKALIT, 8-12 November, 1999.

"Técnicas de Prevención de Riesgos Laborables: Seguridad e Higiene del Trabajo" by José Mª Cortés Díaz, Ed. Tébar Flores, 1999.

IMT: INNOVATION MANAGEMENT TECHNIQUES

"INTEGRATION OF QUALITY, ENVIRONMENT AND SAFETY MANAGEMENT"

ANNEX 1:
CHECKING QUALITY MANAGEMENT, ENVIRONMENT AND SAFETY SYSTEMS

The initial revision and diagnosis of the existing situation will be carried out by the Organization itself following a check-list to be approached separately, but in a coherent way making it possible to be integrated into the whole scheme, of all and every one of the aspects of the Management System: Quality, Environment as well as Safety and Prevention or Occupational i.e. Working Hazards.

1.1 Check-list for the Quality Management System
Taking ISO Standard 9000 for Quality as a reference point, a less strict audit pattern is offered which scans the basic aspects of its management.

1.2 Check-list for the Safety Management System
Taking the UNE-EN Standard 81900 EX for Safety as a reference, a less severe audit pattern is offered which scans the basic aspects of its management.

1.3 Check-list for the Environment Management
Taking the ISO Standard 14001 for Environment as a reference point, a less strict audit pattern is offered that scans the basic aspects of its management.

The check-list is presented in tabulated form. The situation formulated on the left hand side may be answered in the following way:

YES: if the Oganization complies with it
NO: if the Organization does not fulfil it
NA: Not Applicable, if that statement is senseless or cannot be applied to that particular type of Organization.
REMARKS: If you wish to call the attention to any aspect concerning a point that might happen to become relevant when the situation be diagnosed.

The check-list has a total amount of 257 questions (92 on Quality, 97 on Safety and 68 about Environment) and their answers will help define the situation of the Organization.

1. Check-list of the Quality System Management

INDICATORS				
THE MANAGEMENT'S RESPONSABILITIES	**YES**	**NO**	**NA**	**REMARKS**
Quality Policy				
The Management Team has a defined and working Quality Policy that:				
Spreads through all levels of the Organization				
Is understood by the whole staff				
Establishes Quality aims, quantifies and revises them.				

INDICATORS	YES	NO	NA	Observaciones
The Management Team has a defined and working Quality Policy that:				
Spreads through all levels of the Organization				
Is understood by the whole staff				
Establishes Quality aims, quantifies and revises them.				
Organization				
The company has a Quality organization including following aspects:				

Responsibility and Authority				
Necessary resources				
Management Representative				
Revision by the Management				
The Management Team carries out periodically revisions of the Quality System. Conclusions are drawn and actions put into practice.				
2. QUALITY SYSTEM				
The company has:				
Quality Handbook				
Sufficient and coherent Quality System procedures with:				
Established Quality aims and policy				
The complexity of the job				
In the Quality Handbook Quality planning is duly discussed, defining how to carry it out and when it is necessary.				
3. REVISION OF THE AGREEMENT				
The company revises the Agreements with customers andsuppliers and includes following points:				
How to find a solution to the differences appearing betweenthe requirements of an offer and of an order/agreement.				
To revise whether the company has capability and capacityto fulfil the requirements of an agreement/order. Changes to the Agreement				
4. DESIGN CONTROL				
The company controls the design taking care of the following aspects:				
Design and Development planning				
To have established to prepare the planning of every product or service				

The necessary qualification has been defined				
The contributions of the different groups taking part in the design have been defined, transmitted and periodically revised				
Starting data for the design				
The starting requirements for the design are revised: data, initials, legal and statutory requirements, bidding specifications,...				
Ambiguous, incomplete and contradictory requirements are added to the documents				
Final data of the design				
Acceptance criteria and critical features are documentary confirmed				
- The requirements of the starting data are complied with				
Design revision				
Formal revisions of the design are planned and carried out in the appropriate phases				
Design verification				
In the appropriate phases the design will be verified in order to make sure that the final data meet the starting requirements.				
Design validation				
The final product or service will be validated in order to make sure that it complies with the user's needs or requirements in the previously defined working conditions.				
Design changes Before being adopted, all design changes and modifications will be identified, documentary confirmed, revised and approved by authoritative personnel.				
5. CONTROL OF DOCUMENTS AND DATA				
The company controls all documents and data to be applied in its activity, both the inner and the outer ones. - Documents and data are approved and distributed. - Before being distributed, all documents are revised				

and approved - On every quality operative point there are up-to-date editions of the appropriate documents available.				
Changes in documents and data Changes in documents and data are to be revised and approved by the same persons that made them initially or otherwise by other persons duly entitled to that responsibility.				
6. PURCHASES				
The company has defined the procedures to make sure that the purchased commodity fulfils the specified requirements.				
Subcontractors evaluation All suppliers/subcontractors are selected and evaluated. There are defined criteria to homologate (ratify) them initially. There is a defined type and reach of the control to be made over the suppliers/subcontractors including the follow-up of quality affecting issues. There are records of the accepted suppliers/subcontractors.				
Data on purchases The purchasing documents include all data identifying and specifying the requested product. Before their spread all purchasing documents are revised and approved. There is a verification of the purchased products.				
7. CONTROL OF THE PRODUCTS SUPPLIED BY THE CUSTOMERS				
The company controls the products supplied by the customers flaws, defects, losses or damages are recorded and told to the customer.				
8. IDENTIFICATION AND TRACEABILITY				
The company has procedures for identifying the product in the following steps: - Reception. - Manufacturing. - Final product. - When traceability be a specified record, a procedure has been developed to ensure - traceability.				

There are records proving traceability.				
9. PROCESS CONTROL				
- The company plans and identifies production process activities. - Process control key or critical parameters have been defined. - There is an appropriate maintenance of the manufacturing processes to ensure process capabilities. - The qualification requirements of the staff carrying out special processes have been specified. - Records are made and kept in good condition.				
10. INSPECTION AND TESTS				
- The company has procedures to carry out inspection and tests on reception. - It is sure that the received products have not been used before having been verified. - There are established acceptance/rejection criteria.				
Inspection and tests in process.				
- Acceptance/rejection criteria have been established. - The product is kept outside circulation till it has passed inspections and tests during process.				

Inspection and Test Records

It is established the existence of records to be kept with the results of inspections whether they be correct or not.

11. CONTROL OF INSPECTION, MEASUREMENT AND TEST EQUIPMENT

The company controls, gauges and carries out the maintenance of the inspection, measurement and test equipment.

The measuring uncertainty or inaccuracy of this equipment is known and it is compatible with the required measuring competence.

Control procedure

The gauging condition of each equipment is physically identified.
Gauging traceability is checked.

12. UNACCEPTED PRODUCT CONTROL

The company makes sure that any product not fulfilling the specified requirements will not be used or fitted unintentionally.
There is an examination of unaccepted products.

13. PREVENTIVE AND CORRECTIVE ACTION

The company puts preventive and corrective actions into practice.

Corrective actions

Non-acceptance reports and customers' complaints are examined/treated.

Research is made to find out the causes for non-acceptance and the results are recorded.

Execution and efficiency of corrective actions is controlled.

Identification of the staff responsible for that control.

Preventive action s

Different information sources (processes, operations, concessions, audits, records, after-sales service, customers' complaints) are used to detect, analyze and suppress possible Non-Acceptances.

14. MANIPULATION, STORAGE, PACKING, MAINTENANCE AND DELIVERY

The company has product manipulation, storage, packing, preservation and delivery procedures available.
Manipulating methods preventing product damage are supplied.
Storage methods preventing product damage are supplied.
Authorisation methods for product admittance into and delivery from storage areas are stipulated.
Evaluation methods of the stored product condition are stipulated.
Methods for the control (including the materials to be used) of packing (canning, bottling, jarring) and marking of products have been established to ensure fulfilment of the specified requirements.
Methods for the upkeep and separation of products while under the suppliers control have been established.
When specified in the agreement, methods for protection of product quality till delivery at the customer's have been established.

15. QUALITY AUDITS

The company makes internal quality audits.
There is an audit plan.
The whole quality system is discussed.
The audits' results are recorded and communicated to the staff with responsibilities in the audited area.
Persons responsible for the follow-up are identified.

16. TRAINING

The company establishes the need for staff training having jobs affecting quality.
It defines the qualification requirements of the staff making works affecting quality.

TOTAL EVALUATION

2. Check-list for the Safety Management System

INDICATORS

1. *PRL* POLICY

The Management of the Organization defines and carries on a *PRL* policy ensuring that:

- Appropriate to its activity
- Acknowledges the *PRL* as an integral part of the Organization's Management.
- It includes the pledge to reach a high health and safety level in the work place.
- It guarantees that at least the existing legislation on safety and health issues is complied with.
- It will be based on the principles of continuous improvement of preventive action.
- It is known, understood, developed and kept up-to-date by all levels of the Organization.
- It is coherent with other human resource policies designed to guarantee the staff's engagement and wellbeing.
- It guarantees the participation and information of the whole staff of the company.
- It guarantees the right to consult of all the workers in order to allow the continuous improvement of the *SGPRL*
- It is periodically put up to date.
- It carries out systematic audits, both inner and outer ones, to verify the fulfilment of the preventive policies.
- It guarantees the appropriate practical and theoretical training supplying of the necessary resources.

2. *PRL* MANAGEMENT SYSTEM

The Organization has defined and keeps up-to-date a Management System ensuring the appropriate function of the preventive action, including:

- The necessary documents.
- The efficient introduction of procedures and instructions.
- The concordance of the (*SGPRL*) management system with the existing legislation on safety and health matters.

3. RESPONSIBILITIES

The Management's Responsibility and Resources

The Management of the Organization has defined the responsibilities of the *SGPRL* managing staff in order to:

- To obtain the necessary human and material resources.
- To carry on actions aiming at guaranteeing agreement with what has been established by the *PRL* policy.
- To establish de *SGPRL* aims and design the corresponding strategies.
- To co-ordinate preventive action plans and programmes.
- To take action in emergency situations establishing the adequate plans.
- To appoint a member of the management team with enough authority to ensure fulfilment and updating of the requirements.

Revision by the Management

The organization's management revises periodically the *SGPRL* and holds records of these revisions.

Responsibility for the staff, communication and training

The organization's management guarantees that all members of the staff, independently of the professional qualifications are aware of the following points:

- The need to accomplish the established policy and aims.
- The effects of their activity on their safety and health.
- The necessary co-operation to the organization in order to guarantee safe working conditions.
- The responsibility incurred upon failure to comply with their obligations against the *PRL* in accordance with the existing legislation.

The organization guarantees inner and outer communication as follows in detail:

- Collection of information from outside sources concerning every *PRL* aspect, including the legislation involved.
- The management's engagement in:
  - Advisory meetings, safety rounds, etc.
  - Researching incidents, accidents and illnesses coming from working conditions, safety inspections and training.
  - Planning, control, audit and revision of actions.
- Discussion over safety and health issues during management meetings.
- Documentation of the statement concerning policy, organization and procedures and existing legislation on *PRL* matters.
- Use of bills and posters, bulletins, periodicals and similar communication means.

- Preparation and spread of mandatory information among organizations and individuals not belonging to the company.

The organization identifies training needs and offers every worker appropriate and enough practical and theoretical information in preventive matters.

All workers having been assigned preventive functions have got the adequate qualification.

4. RISK ASSESSMENT

The management has planned preventive action on the grounds of an initial assessment of dangers to the workers' safety and health.

The organization records the legal, statutory, normative and inner requirements affecting itself in *PRL* matters.

The organization:

- ♦ Identifies potentially damaging i.e. harmful or hurting, damages.
- ♦ Assess risks that might come from these damages.
- ♦ Checks these risks by means of adequate steps.
- ♦ Puts into practice and keeps up to date these steps.

Risk assessment has been carried out qualitative and quantitatively by means of:

- Reference to values or legal requirements that may be verified through measurement or checking.
- Reference to legal requirements of qualitative nature allowing an appropriate evaluation.
- Reference to good practice codes or inner requirements and commonly accepted assessment procedures.

The methods or criteria chosen to carry risk assessment out have been, if any, in preference order:

- Spanish UNE standards.
- Guidelines brought out by specialised scientific-technological institutions belonging to Public Administrations.
- International Standards or Guidelines brought out by institutions of acknowledged prestige.

The organization controls risks by means of decisions taken on the grounds of risk assessment and the legal requirements establishing prevention minimum levels.

The organization has already defined the reliability of the control steps it has put into practice making use of the following importance order:

- It fights risks in their origin.
- It replaces dangerous things by those having little or no danger at all, i. e.: it substitutes things having little or no danger for dangerous ones.

- It adapts the job to the person, specially with regard to:
  - The conception of the working place.
  - The selection of equipment as well as of production and working methods.
  - The lessening or toning down of repetitive and monotonous work as well as its effects on the worker's health.
- It bears in mind technological development.
- It takes steps giving more importance to collective protection than to the individual one.
- It gives the necessary instructions to the workers.

The organization keeps and checks that the preventive steps it has taken work properly.

The organization examines risk assessment and control steps when technological changes and developments are to be introduced.

5. PREVENTION PLANNING

Planning defines in writing the necessary action leading to an effective risk control.

P.R.L. **Aims and Goals**

The organization has established in writing its aims and the goals following from them.

It does not only abides by the existing legislation and statutory requirements, but it has also established other aims and goals leading to the promotion of the improvement of working conditions.

The aims of every step are accompanied by specific goals, which should be measurable as far as possible and reachable, including the terms, responsible persons and resources assigned to its achievement.

P.R.L. **Management Programme**

The organizatioon has established a programme with its time-table in order to reach the *P.R.L.* aims and goals.

Handbook

The organization has established a handbook or handbooks in writing that:

- present in an easy understandable way the policy, aims, goals and programme of the *P.R.L.*.
- Documents functions and responsibilities of all involved workers in the organization, including management.

Documentation

The organization has established at least the following things in writing:

- Risk evaluation for safety and health.
- Preventive action planning.
- Protection and prevention steps to be taken and, if thought advisable, protection material to be used.
- Periodical controls of working conditions and of the workers' activity during their working time in order to detect potentially dangerous situations.

- Controls of the workers' health and conclusions obtained from them.
- Working out and upkeep of a list of working place accidents and of professional illnesses that may have caused working incapacity for a time longer than a working day as well as of the way the authorities have been informed.

Active Control

The organization checks that the decided actions concerning *PRL* matters have been carried out and takes special care to the following elements:

- Working documents defining the way to be followed by the organization's workers in order to carry their activity out.
- Aim achievement control.
- Systematic inspection of sites, premises, facilities, equipment and machines.
- Taking samples in order to examine specific *SGPRL* aspects.
- Taking environment samples; measurement of the exposure to substances or energies.
- Assessment of the staff and workers' behaviour with regard to the identification of unsafe working practices that might require correction.
- Analysis of the whole staff's attitudes at all levels.
- Health assessment.
- Analysis of documents and recordings.

Reactive Control

The organization investigates, analyses and records *SGPRL* failures:

- Incidents
- Accidents
- Work caused illnesses
- Recommendations or requirements from official institutions.

8. *P R L* RECORDS

The organization:

- Records the accomplishment degree of the aims and goals in *PRL*.
- Identifies and files the *PRL* recordings.
- Makes and keeps the documents regarding the aims and goals in the *PRL* at the labour authorities' disposal.
- Files the *SGPRL* revisions' and audits' results as well as the training records.

***SGPRL* Audits**

The organization has established procedures for the development of audits in order to revise the *SGPRL*

ASSESSMENT TOTAL

3. Check-list of the Environment Management System

INDICATORS

1. ENVIRONMENTAL POLICY

The organization has, defines, communicates and carries on a policy that:

- is appropriate for Nature, for the environmental scale and impact of its activities, products or servicies.
- is at public disposal.
- includes the pledge to steadily going on bettering, preventing and/or putting pollution down to the lowest possible measure.
- agrees with other policies carried out by the Organization (such as Quality policy and/or Health and safety, and/or General policy, etc.

lowers environmental impacts down to levels not going over those agreeing with the economically feasible right application using the best technology available.

2. ENVIRONMENT MANAGEMENT SYSTEM

The Management has defined and keeps an Environment Management for its Organization including:

The necessary documents: procedures, instructions, handbooks, etc.

The organization has an industrial (or deontological) code (it is compulsory to have it) and/or agreements with public authorities for the application of regulations, rules, etc.

3. INTRODUCTION AND OPERATION

Structure and Operation

Responsibilities and authority to provide an efficient environment management have been defined in order to:

- supply the necessary resources.
- identify and record any environmental problem and provide solutions.
- verify that these solutions are being put into practice.
- act in emergency situations.

Staff and resources

The Organization's management has appointed in writing representative executives who, apart from other activities, will have well defined roles, responsibilities and be entitled to take decisions on environmental matters.

Training, Awareness

The Organization identifies the whole staff's Training needs on those matters concerning the environment that all staff members know and be aware of:

- the importance of pledging oneself to environmental policy and procedures.
- the existing or potential important environmental impacts resulting from their working activities and the environmental benefits resulting from having carried the improvement out.

Communications

The organization takes care of the inner communication among the different organizational levels and functions.

S.G.M.A. **Documents**

Emergency plans, if deemed advisable, hold information and instruction on environmental subjects referring to the case in question.

Control of Documents

It is specified who should carry out revisions and approvals when changes be introduced in the documents.

The Organization control all and every document required by the regulations or standards.

The corresponding valid documents in force are available in all the points where essential operations are carried out for the operation of the System.

Operational Control

The company/organization including production/manufacture, should it carry out assessments of its environmental effects, they should regard all phases from the project of the product down to its transformation in waste or refuse.

The evaluation carried out by the company/organization including services refers all aspects, phases, steps, practices and procedures for the development and prevision of services.

The Organization controls the products/services it manages in order to detect their influence on Environment.

The Organization identifies those operations and activities associated with the production of significant environmental impacts.

Verification and control of process features (emissions, dumping and spilling, as well as waste disposal, etc.) has been established.

Emergency Response and Preparation

When the company evaluates the environmental effects takes into account both normal and abnormal working and operating conditions and emergency situations (fires, traffic accidents, explosions, floods).

Risks and damages arising from such a situation, such as the seriousness of the impact on the environment, in order to define emergency plans.

4. PLANNING

Environmental aspects

The organization identifies the environmental aspects of its activities, products or services in order to control them.

Direct effects are considered:

Controlled and uncontrolled emissions to the atmosphere.

Controlled and uncontrolled dumping or spilling into the water and the sewer system.

Management of solid waste assimilable to urban refuse waste as well as other ones, specially those being inert and dangerous.

Soil pollution.

Raw materials including also: soil use, water, fuels and energy as well as other natural resources.

Rational emission and use of thermal energy as well as noise, smell, dust, vibration and visual impact reduction.

Impact on specified environmental sectors and ecological systems.

The following points are considered Indirect effects:

Extraction of raw materials supplied by other ones.

Other companies on which investments have been made.

Misuse and transformation into waste or refuse of products of the Organization.

In the processes, inputs and outputs associated with their relevant existing and past activities, with their products or services (energy balances, ***M.P.***s, water, emissions into the atmosphere, refuse or waste) have been taken into account.

Legal requirements and others

The organization identifies and has access to the legality and other requirements that the organization directly endorses applying them to the environmental aspects of its activities, products or services.

Aims and goals

The organization establishes environmental aims and goals.

When the organization makes projects concerning technological actions to be developed from the environmental point of view, it will bear in mind the economically acceptable and best available technology having an appropriate cost for the organization implied.

Environmental Management Programme(s)

There is an environmental programme aiming at fulfilling the commitments held in the environmental policy.

5. DETECTION AND CORRECTING ACTIONS

Monitoring and Measurement

The Organization monitors and measures the main features of its operation and activities being able to have a significant impact on Environment.

It is necessary to identify and document which data are to be obtained for each activity or activity sector of the company.

Acceptance criteria and the actions to be put into practice when measurements are not satisfactory should be established and documented.
The organization evaluates the compliance with the environmental legislation and regulations.

Non-conformity and preventive and corrective actions

The organization defines responsibilities, investigates non-conformities and puts actions into practice in order to mitigate or lessen whichever the impact caused.

Records

The organization keeps environmental records
These records include recording successions as well as results of revisions and audits.

Environment Management System Audits

The Organization revises the Environment Management System in order to:

- Check its efficiency.
- Check if it has been correctly put into practice and maintained.

An audit plan is established including the following sections:

- Activities, areas or sites having organizational structures.

Operational and administrative procedures. Operations and processes. Documentation, reports and records.

Information on the Management's audit results for its revisions is provided.

The company makes a *MA* statement and it is revised.

It is written in a shortened and easily understandable wording.

Results criteria are established in writing.

6. ENVIRONMENTAL REPORTS

The organization prepares an Environmental Report at a established periodicity and puts it at the public's disposal.

- It includes activities, processes and products of the Organization.
- It includes the main *SGMA* lines (MA policy and programme) as well as its efficiency.
- It includes *MA* actions taking special care of its *MA* aims.

In the Report, data concerning name and full address of the Organization, description of the premises and sites, activities, products and services discussed in the Report, a copy of the *MA* policy and aims of the Organization as well a statement of the data that have been used to write the aforesaid Report have been specified.

4. Conclusion about the Check-list

The answers to the different questions in the check-list can be first studied by observing each of the failures to comply and ordering them subject to their seriousness or to the urgency of their correction.

The performance indexes for each Management System or in general. This will allow us to compare the results of the different revisions and check the improvement of the system. It should not however be forgotten that in such a case all failures to comply are being taken as having the same magnitude and importance although this is not the case.

The calculation will be carried out as follows:

- Percentage of the overall compliance with the Quality, Environment and Safety Management System.

$$\text{Compliance Percentage} = \frac{\text{YES amount} \times 100}{257}$$

- Compliance Percentage with the Quality Management System

$$\text{Compliance Percentage} = \frac{\text{YES amount} \times 100}{92}$$

- Compliance Percentage with the Safety Management System

$$\text{Compliance Percentage} = \frac{\text{YES amount} \times 100}{97}$$

- Compliance Percentage with the Environment Management System

$$\text{Compliance Percentage} = \frac{\text{YES amount} \times 100}{68}$$

5. DAFO Analysis

Besides studying the answers to the check-list, something that can give us a fairly accurate and definite view of the existing needs, the DAFO analysis of the “oportunities and threats” is a method that serves to round off the aforesaid study by means of a generalist study of the three Management Systems and of the compliance with the legislation ruling the safety and environmental aspects.

In the left hand matrix column the aspects to be submitted to study are shown:

- QUALITY M. S.
- ENVIRONMENT M. S.
- SAFETY M. S. (or *P.R.L)*
- ENVIRONMENTAL LEGAL REQUIREMENTS
- SAFETY AND *P.R.L.* LEGAL REQUIREMENTS

Hereunder we round off the following columns in accordance with these patterns:

- INNER ANALYSIS: it regards to aspects of the Organization itself.
  STRENGTHS AND WEAKNESSES of the Organization, of each of the Management Systems in particular.

- OUTER ANALYSIS: concerning the outside aspects of the Organization: market, competitors, society,... THREATS to the Management Systems that might come from that environment, as well as the OPORTUNITIES or improvement room they may have.

DAFO ANALYSIS			
	INNER ANALYSIS		OUTER ANALYSIS
	STRENGTHS	WEAKNESSES	
THREATS	OPPORTUNITIES		
QUALITY M. S.			
ENVIRONMENT M. S.			
SAFETY M. S.			
ENVIRONMENTAL			
LEGAL			
REQUIREMENTS			
WORKPLACE			
ACCIDENT			
RISK			
PREVENTION			
LEGAL			
REQUIREMENTS			

6. Compliance with the exisiting legislation

It is to be examined whether the Organization has defined the most significant environmental aspects calling for abiding by regulations as well

as the aspects regarding Safety and Occupational Hazard i.e. Workplace Accident Risks.
Have the significant environmental aspects affecting the Organization in the following subjects been defined?

- Waters
- Atmosphere
- Noises and Vibrations
- Waste and refuse
- Soils
- Impact on scenery and the ecosystems

IMT: INNOVATION MANAGEMENT TECHNIQUES

"INTEGRATION OF THE QUALITY, ENVIRONMENT AND SAFETY MANAGEMENT"

ANNEX II
PERFORMANCE PROGRAMMING TOOL

Carrying out a matrix form tool, not only the aims to be achieved will be detailed but also the performances to be carried out in order to innovate from the point of view of Quality, Environment and Industrial Risk Prevention in the different aspects and activities occurring in the Organization.

In the first matrix column the different areas in which the Organization is divided and in which the improving actions deriving from the initial study are shown. The Management of Quality, Environment and Safety itself appears as another area among other ones. This division tries to be as general as possible, although it might be different for each Organization.

Filling in the following columns the Innovation Action Plan will be taking detailed shape detailing the detected situation, the actions to be carried out, the aims to be achieved, the available means, the persons in responsible charge as well as the estimated dates when the Action Plan will be started and finished.

2.2. INNOVATION ACTION PLAN

Indicators: Existing Situation	Actions & in which order	Aims	Means and Resources	Responsible Person in Charge	Starting Date	Finishing Date
MANAGEMENT & PLANNING						
MARKETING						
INNOVATION						
ESTRATEGIC POSITION & ASSOCIATIONS						
RESEARCH & DEVELOPMENT						
ACTIVITY DEVELOPMENT,						

PRODUCTION

QUALITY,
SAFETY M. S.

FINANCE