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Quality and Safety Management Systems

Internship done at ECTA

Internship Report presented as a partial fulfilment of
the requirements of the Master of Business Management

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ACKNOWLEDGMENT

INTRODUCTION

An internship is part of the master program in Management in the Faculty of Economics of Coimbra's University. This experience has the objective of providing the students with a first work experience.

The internship took place in the offices of ECTA, for five and a half months between October 2009 and March 2010. I was initially supervised by Mrs. Rose-Marie Pype[1], Logistics Manager of ECTA, followed by Mrs. Cathy Demeestere, Secretary General of ECTA and of course by Mrs. Patrícia Moura e Sá, Professor at Faculty of Economics of Coimbra's University.

The theme of this report is Quality and Safety Management Systems. This report is a partial fulfilment of the master programme in business management of the University of Coimbra. This internship provides practical experience which can be applied in later professional undertakings. My internship was also very useful for developing and maintaining ECTA's activities.

The purpose of this report is to describe the internship period and the literature studied in order to make an analysis of the internship period. The paper has three main parts. In the first part, a description of the organisation and the internship is presented. Then a theoretical study is developed with the objective of analysing what ECTA is creating. In the third part, and final part of the report, a critical analysis is done and some conclusions are presented.

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[1] My tutor, Mrs. Pype, had an accident before Christmas. Due to this accident, she was not able to follow my work during two months of internship (since the 18th of December till the end of February). In the end of February, when Mrs. Pype was about to return from her sickness leave, she decided to quit her position in the company. During my last month in ECTA, Mrs. Cathy Demeestere, the Secretary-General of ECTA and EPCA, was my supervisor

1. INTERNSHIP SETTING AND MAIN ACTIVITIES

1.1. Organisation Presentation

1.1.1. History

In October 1997, Europe's chemical transporters formed the European Road Transport Association (ECRTA) during the 24th Logistics Meeting in Barcelona. This meeting was organised by the European Petrochemical Association (EPCA) and the purpose was to provide a platform for representing their interests in discussions with international regulatory bodies and major chemical producers associations. In addition to the transport of chemical goods by road, it was determined that ECTRA would quickly provide strong support for the intermodal transport of such goods. Since then, the name has been changed to European Chemical Transport Association (ECTA), to reflect the fact that all modes of transportation (including rail and inland waterways) are represented[2].

1.1.2. The organisation and functioning of ECTA

ECTA has been granted by Royal Decree of 11 February 1999 legal personality as an international non-profit organisation in accordance with Belgian law. In the last eleven years ECTA has evolved into a proper association of companies in the chemical transport sector, recognized by EU authorities and many other stakeholders. ECTA is an International Association without Lucrative Purposes (AISBL)[3].

The ECTA policy is decided by its Board of Directors. The Board consists of a minimum of five and a maximum of fifteen members, elected by the General Assembly

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2 In ECTA's website (www.ecta.be).

3 Vereniging zonder winstoogmerk (Dutch, abbreviated vzw) or Association sans but lucratif (French, abbreviated asbl) that means 'non-profit organisation'. For international organisations, the equivalent is aisbl. It is a formal designation under Belgian law, and organisations are entered in a register and allocated numeric identifiers.

for a period of three years. The daily management, administration and the implementation of the ECTA policies and initiatives are managed by the appointed Secretary General.

1.1.3. Best Practices in Chemical Logistics

ECTA ensures the chemical transport industry with a consistent, unified approach matching the needs and expectations of the chemical industry and contributes to the continuous improvement of the safety, quality and the environment impact of the chemical transport and logistics chain in Europe.

In joint working groups[4] formed of representatives of transport service providers and producers of chemical goods, with – where appropriate – the participation of authorities and institutions, ECTA develops in an open and transparent manner "Best Practices" in transport and logistics of chemical goods in Europe. The Guidelines which are developed in the working groups and in close cooperation with the European Chemical Industry Council (Cefic) are actively promoted through ECTA to the chemical transport sector and are freely available and downloadable on www.ecta.be. These working groups prepare best practice guidelines in the health, safety and quality themes. In its beginning, ECTA has created working groups on standardisation of road and rail transport equipment, guidelines for harmonised delivery performance measurement, empty leg reduction and optimal distribution systems for chemicals in Europe initiative, intermodal, accident/incident database, 16-hours operation. ECTA invests in the improvement programmes of the SQAS[5] packages and the management of the SQAS Tank Cleaning database for the chemical transport industry.

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[4] ECTA has initiated the working groups with EPCA and Cefic.
Cefic is the Brussels based organization representing the European chemical industry. Since its creation in 1972, Cefic has grown to become one of the largest and most efficient advocacy networks amongst the industry trade organizations in Europe and in the world.

[5] SQAS (**S**afety & **Q**uality **A**ssessment **S**ystem) is a system to evaluate the quality, safety, security and environmental (QSSE) performance of Logistics Service Providers (LSP's) and Chemical Distributors in a uniform manner by single standardised assessments carried out by independent assessors using a standard questionnaire. This ensures consistency and avoids duplication of assessments.

1.1.4. ECTA's Mission and Purposes

- **Development of Best Practices** in the Transport and Logistics of Chemical Goods in Europe. ECTA has been formed to improve the standards of efficiency, safety and quality as well as the environmental and social impacts of the transport and logistics of chemical goods in Europe. It aims to reach this objective through:

  - Joint studies of a scientific nature in co-operation between its members, other associations having related interests, authorities and institutions within Europe be it at a regional, national, European or international level.
  - The working groups are formed by representatives of transporters, logistic service providers and producers of chemical goods, with, where appropriate, the participation of authorities and institutions in order to develop best practices implying improvement in the transport and logistics of chemical goods in Europe.

ECTA informs its members as well as its key audiences, shippers, authorities and institutions regularly on its activities and on the evolution of transport and chemical logistics matters. ECTA organizes effective communication tools for targeted information exchange:

  - With nominated official representatives or targeted contracts in member-companies:
    - member's only area on the website
    - circulation on News Flash
    - working Groups reports
    - direct mail
    - meetings networking events: "Leaders in chemical industry"
  - With customers and other organisations:
    - public part of ECTA's website
    - printed copies of Guidelines, Brochures
    - seminars and Conferences

- working Groups

- **Representation** (at an European level)

  ECTA aims to provide the chemical transport industry with an authoritative voice at European level. In that sphere it ensures that the industry's views are effectively communicated to key audiences, authorities and institutions within Europe at regional, national, international and European level. It co-operates and participates in the dialogue between logistics service providers, the chemical industry, the authorities and the institutions to pro-actively improve the transport of chemical goods.

- **Information**

  ECTA informs its members as well as the abovementioned key audiences, authorities and institutions regularly on its activities and on the evolution of transport and logistics matters in Europe. Where appropriate and upon request, ECTA can provide advice and assistance to its members on Europe transport issues. It promotes initiatives which may be of interest to the transport of chemical goods in Europe.

The main purposes of ECTA are the working groups and the Responsible Care Programme. ECTA has formed several working groups, many of them with chemical producers to identify and develop productivity improvements. The aim of these groups is to develop best practices, by means of standardisation, heading to improve in safety, environmental protection and cost performance. ECTA has developed together with Cefic in joint working groups several sets of "Best Practice Guidelines for Chemical Logistics" and widely promotes these best practices. In addition, ECTA contributes to the development of SQAS, the Safety Quality Assessment System of Cefic, which supports continuous improvement in HSSEQ management in the chemical supply chain.

1.1.5. *Responsible Supply Chain Partner and Responsible Care*

ECTA underlines the importance of a "responsible" chemical transport industry in the chemical supply chain and seeks recognition for its efforts as a partner "out of the gates" in the responsible care programme of the chemical industry.

The environmental and social impacts of transport and logistics of chemical goods in Europe are also addressed by ECTA. A lot of attention is paid to the role of the driver in ensuring excellent chemical transport. Long-term efforts of ECTA are dedicated to create the recognition chemical truck drivers deserve for their active and committed involvement. Direct consultation of the drivers provides the input and allows ECTA to pave new paths towards respect of the role of the chemical drivers in their daily work and towards improving productivity of both the transport and the chemical industry in logistics interaction.

The association fosters solidarity between its members and organizes a mutual assistance scheme for emergencies in case of accidents involving tank transports. ECTA encourages its members to share the learning in the implementation of best practices in SHEQ matters which accelerates their introduction. Under an EC Grant[6] obtained from DG Tren[7], ECTA assists Cefic in the development and promotion of Best Practices to drive continuous improvement in the Safety Performance of road transport operators.

Responsible Care (RC) is a worldwide initiative developed by the International Council of Chemical Associations (ICCA)[8]. ICCA supports the extension of RC throughout the chemical community and along the value chain to sectors allied with the chemical manufacturing industry (such as transport companies). RC has the objective of drive continuous improvement in environment, health and safety (EHS) performances. This objective is achieved by meeting and going beyond legislative and regulatory compliance and by adopting cooperative and voluntary initiatives with government and

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[6] The Commission awards money in the form of grants in order to implement projects or activities in relation to European Union policies.

[7] DG Tren: Directoract-General for Energy and Transport of the European Union.

[8] The International Council of Chemical Associations (ICCA) is the world-wide voice of the chemical industry, representing chemical manufacturers and producers all over the world.

other stakeholders. RC is an ethic and a commitment framework that seeks to build confidence and trust in an industry that is indispensable to improving living standards and the quality of life.

Regional governance of RC and legal ownership of RC logo in Europe resides with Cefic. On the 23rd of October 2008 Cefic entered into agreement with ECTA establishing the ECTA Responsible Care Programme for its chemical transport companies. As the chemical transport companies operate across-boarders in Europe, ECTA and Cefic agreed to cooperate in a coordinated way throughout Europe. ECTA is the first logistics organisation that develops a Responsible Care programme which is coordinated at a European level. ECTA coordinates communication on Responsible Care with Cefic providing input and information on the collective performance of its member companies in several aspects of RC in aggregate formats for transmission to National Associations of the chemical industry. As a RC association, ECTA aims to establish a process of liability in chemical transport to accomplish the objectives of improved performance; in the case of ECTA, the inspirational goal is "zero accidents".

The Responsible Care Global Charter is the basis for the ECTA Responsible Care Programme and contains nine key elements:

1. Adopt global responsible care core principles.
2. Implement the eight fundamental features of all responsible care programmes.
3. Commit to advancing sustainable development.
4. Continuously improve and report performance.
5. Enhance the management of chemical products worldwide - product stewardship.
6. Champion and facilitate the extension of responsible care along the chemical industry's value chain.
7. Actively support national and global responsible care governance processes.
8. Address stakeholder expectations about chemical industry activities and products.
9. Provide appropriate resources to effectively implement responsible care.

By signing up on ECTA's Responsible Care programme, ECTA member companies commit themselves to implement ECTA's Responsible Care principles into their strategy, management systems and daily operations. ECTA establishes and manages, in cooperation with Cefic, the ECTA RC Programme for its members according to the eight fundamental features[9] set by ICCA:

1. **Establish and implement a set of Guiding Principles** to be signed by the Chief Executive Officer (CEO) of its member companies before joining the ECTA RC programme. The RC commitment agreement between ECTA and the transport company is done at corporate group level. There is no agreement available on the level of a division or a single operating unit. The commitment relates to continuous improvement in Health, Safety, Security, Environment and Quality (HSSEQ) management throughout the whole organisation. Chemical Transport Companies joining ECTA RC programme will be required to commit to the ECTA RC Guiding Principles:

   - Continuously improve the environmental, health and safety performance of their transport operations of chemical goods so as to avoid harm to people and the environment.
   - Ensure that proper care is taken to protect the safety and health of all people involved in their chemical transport operations.
   - Minimize the environmental impact of their transport activities.
   - Use resources and fuel efficiently and minimize waste.
   - Take adequate measures to ensure the security of their operations.
   - Collect data and report openly on their performance, achievements and shortcomings.
   - Listen, engage and work with people to understand and address their concerns and expectations.
   - Cooperate with governments, international institutions, organizations and authorities in the development and implementation of effective regulations and standards to improve transport safety.

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[9] In "ECTA Responsible Care Programme and Implementation Guide"

- Encourage the responsible management of all those who are involved in providing a service to them, in particular transport sub-contractors and cleaning stations.

2. **Ensure appropriate use of the RC logo by its RC members companies.** The transport companies who join the ECTA RC programme will be granted the right to use the Cefic registered RC logo, which are and remain under the ownership of Cefic.

3. **Implement management practices through a series of systems, codes, policies or guidelines** to assist companies in achieving a better performance. The transport companies joining the ECTA RC programme need to have management systems in place to identify the HSSE risk occurring from the transport of chemicals and correctly control and manage them in order to guarantee that the transport and associate handling of chemicals is unlikely to have adverse safety, security, health and environmental (SSHE) impacts. Under RC, the RC companies commit to implement and perfect HSE management best practices and this will result in a continuous improvement in safety and environmental performance of these transport companies. The various elements of the management systems that chemical transport companies will implement, in the case that they are not yet fully in place at the beginning of their RC membership, as part of the RC Improvement plan of the company are addressed in the management practices illustrated in the ECTA-Cefic Guidelines "Recommendations on Safety, Health and Environmental Management Practices for Logistics Service Providers" completed with the Guidelines on subcontracting and BBS (Behaviour Based Safety). The Best Practices Guidelines can be downloaded from the website www.ecta.be.

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subcontracting and BBS (Behaviour Based Safety). The Best Practices Guidelines can be downloaded from the website www.ecta.be.

RC best practice management practices are related to:

- Commitment and awareness of HSSE policies.
- Data, information and regulation.
- Risk assessment and reduction.
- Selection and monitoring of subcontractors.
- Environmental performance of equipment.
- Training and behaviour based safety.
- Reporting and evaluation of incidents and accidents.
- Emergency response.
- Control of operations.
- Auditing.
- Security.

RC companies support their continuous improvement with annual goals and targets, which are set and monitored in the RC improvement plan. This plan is developed on group level and each year provided to ECTA Secretariat as part of the RC scheme. The improvement plan is based on the available SHEQ&S data to identify improvement needs. Each year the RC company should also provide an evaluation, which includes achievements and shortcomings, from the improvement plan from the previous year. Mutual emergency response for transport accidents can be provided between RC companies upon request and on a voluntary basis. For this reason, the RC company must provide its 24/7 emergency telephone number(s) to the other ECTA RC companies through the ECTA secretariat.

4. **Develop a set of performance indicators** against which improvements in various aspects of RC of the collective performance of its member companies can be measured.

ECTA will collect KPIs (Key Performance Indicators) appropriate to testify on the performance in critical areas related to RC: health, safety, and environment[10]. These KPIs will follow the rules of Cefic's requirements as listed in the Cefic/ECTA agreement and will be gathered for 2009 and be made available for discussion in the end of the first quarter of 2010. The KPIs that will be measured are: number of km per year for chemical goods transportation in Europe (mio.km/year); total of employees; mode of transport used; number of accidents with motor vehicles for this year; number of accidents at loading/ unloading/ intermodal operations for this year; number of training hours of drivers per year; split of trucks used for chemical transport between the Euro categories; fuel consumption per ton km and CO_2 production per ton km (when possible to collect).

The objective is to define KPIs which are available in the transport companies and which can be provided without adding administrative burden to the companies. The goal is to collect data, aggregate this information and obtain an overview of the total efforts done by the RC companies.

5. **Communicate with interested parties.**

ECTA RC companies encourage the responsible management of all those who are involved in providing them a service, in particular the transport subcontractors and cleaning stations, and they will provide them with the ECTA RC Guiding Principles. They also encourage non-RC companies to participate in the initiative.

ECTA RC companies support the performance measurement, improvement, verification and reporting initiatives of ECTA on a Euro-wide basis. They ensure that the annual data collection of KPIs and reporting to ECTA is incorporated in their management system and they appoint a RC coordinator to supply the information to ECTA. ECTA will consolidate the annual collection of the KPI data from its member companies on a Europe-wide basis respecting the confidentiality

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[10] My Internship was centred on all the Responsible Care process. I had to update the information about the RC companies and start the process for an ECTA companies to sign the RC agreement. As one of the ECTA objectives for 2010 is the collection of KPI's concerning health, safety and environmental issues from the RC companies, I had to develop the KPI guidelines and KPI form to be filled in by the RC companies.

of the information. ECTA publishes the consolidated, collective performance data in its annual RC report and will provide to Cefic these data.

The ECTA Board will formally adopt an annual ECTA RC plan for the association, upon proposals issued by the RC Steering Group. ECTA divulges to its RC members its Annual Plan each year. The results and the evaluation of the previous annual RC plan are reported to Cefic and to the RC member companies.

6. **Share the best practices through information networks.**
   For more than ten years, ECTA member companies invested through their membership fee to organising the sharing of best practices with fellow transport companies and with chemical producers. ECTA and Cefic developed in cooperation guidelines and published many "Best Practices in chemical logistics".

   Under the RC program, these activities of sharing best practices will be continued as characteristics of the RC programme.

7. **Encourage CEOs of its member companies to commit to the RC Guiding Principles** and to participate in RC. ECTA strongly encourages its members to join the ECTA RC program. The membership of ECTA will be actively approached to join in the RC scheme.

8. **Introduce and apply systematic procedures** to verify the implementation of the measurable elements of RC by member companies. ECTA sets up a RC coordinator function, a RC Steering Team Group and a RC platform to manage its commitments as association under RC. The ECTA Board appoints the RC coordinator of ECTA who will coordinate the inputs of the RC member companies and collect the Key Performance Indicators.

   Before the signing of the RC agreement with ECTA, the transport company should produce clear evidence that it has a written policy in place concerning the management's commitment to the safety of all operations, the health of employees, the protection of the environment so too the quality of the operations and services and meeting the customers' requirements in a significant and economic justifiable

way. This company policy should also include appropriate training programmes for drivers. The RC company is obliged to respect every significant national and international laws, regulations and industry codes concerning transport and related operations. Consequently, the RC company needs to have a formal system in place for staying up to date with all relevant legislation and legislative developments in the area of SHEQ&S.

The CEO of the company/group or the appointed manager enters into the RC agreement and is obliged to notify ECTA of the locations of the major European operating units. ECTA needs to have access to all the reports of external assessment of HSSEQ performance available in the context of verification. This access has the function of fulfilment of ECTA's tasks under the ECTA RC agreement. To support the company policy to improve its HSEQ&S performance under RC, the company has to set and monitor annual goals and targets for improvement. This is the RC annual improvement plan that can incorporate selected parts of the ECTA Annual Plan. The continuous improvement has to be documented by a self-assessment report and shall be documented in the evolution over time of the SQAS report(s) provided by the RC company.

Transparency and confidentiality in the ECTA RC programme is very important. ECTA guarantees that the appropriate know-how and means to execute the aspects related to its RC commitments are made available. ECTA will additionally develop and administer transparent verification processes of its member companies' implementation of their RC initiative. Also, ECTA acts as an Assurance Provider regarding the collected data and the RC Transport companies act as reporting Organisation. And finally anyone in the ECTA RC organisation who has access to individual company data shall commit to strict confidentiality as regards to company individual information obtained in context of RC.

1.1.6. RC implementation, step by step

1. CEO commitment: Ensures that the RC principles are dispersed all over the company; with the top management commitment the RC principles extend to employees, customers and the community.

2. Using the logo: ECTA supervises the appropriate use of the RC logo and hands out instructions on how to use it in each signed agreement.

3. Best Practices: ECTA has integrated some of the Best Practise issues in joint groups with Cefic. These existing guidelines make it unnecessary to write a new text on HSEQ for RC purposes. Based on these guidelines, the RC companies are able to draw their improvement plan and conduct performance measurements.

4. Encourage participation: ECTA encourages participation in RC by its member companies that are proactive in HSE management and can show their commitment to SQAS.

5. Multilateral communication.

6. Share best practice: ECTA RC companies will communicate and encourage RC management also with their service providers, including tank cleaning stations and subcontractors.

7. Verification: Before signing the RC agreement, the RC transport companies have to evidence their compliance by allowing access to SQAS. This is done by ECTA for RC purposes and in line with confidentiality rules. Individual improvement plans presented to ECTA that approves them and suggests changes in line with the results of the SQAS assessments.

8. Key Performance Indicators: ECTA established the main KPIs on safety (accidents and incidents) and environmental measurements. ECTA is discussing now an approach to calculate emissions considering that transport companies are demand-driven derived activities. Differences between road and intermodal transport and driving habits need to be subject to carefully analysis.

1.1.7. Member's Profile

Membership of ECTA is made up of full and associate members. The membership applications are decided by the Board. Full members are Logistics Service Providers (LSPs) involved in the transport of chemical goods in Europe. Full members may send participants to all the activities of the Association and are eligible to cast a single vote by their official representative on issues where a vote is required. Associate members are companies or organisations who can, in the opinion of the Board, contribute to the realisations of the objectives of ECTA, such as international or national transport associations, manufacturers of transport equipment, storage companies, cleaning stations.

ECTA comprises more than 80 members in 14 countries. ECTA members are companies that are active in the chemical transport industry and organize the land transportation of chemical goods irrespective of the transport mode used: road, rail, barge, short sea shipping, and air. ECTA members are service providers to the chemical industry and are proactive towards their customers' needs and their stakeholders' interests. ECTA members control and influence the Safety, Health, Environment (SHE) and quality aspects of the transports that they organize and make an effort to implement the ECTA guidelines in these areas.

1.2. Internship Description

1.2.1. Internship Details

This section of the internship report is devoted to describe my functions in ECTA, as well as the main activities performed. The internship took place in the headquarters of the European Petrochemical Transport Association (EPCA) which is shared with ECTA, IMPCA (International Methanol Producers and Consumers Association) and F&L (The European Freight and Logistics Leaders Forum). The headquarters are located in Tervurenlaan 270 in Brussels, Belgium. The internship started on the 19th of October 2009 and lasted until the 31st of March 2010.

During the first week I had the opportunity to read several documents about the organisation, its structure and functioning rules and the projects of the organization, especially about the Responsible Care programme which I dealt with. This allowed me to become familiar with the association's activities and goals.

After the adaptation period, I started to assume the responsibilities that I will explain below and that were defined in the internship protocol. The internship was related to the Responsible Care scheme for chemical transport companies, the supply chain management and Key Performance Indicators. I participated in the implementation process of the ECTA Responsible Care scheme for European Chemical Transport. This included the reporting on key performance indicators (KPI) and the setting up of a verification process to prove the implementation of Responsible Care. The KPI guidelines and the KPI form to be filled in by the Responsible Care companies can be found in the annexes section, I am the author of both documents. My main task during the internship was the management of information concerning the RC companies, including information requests to the company's representative and information storage.

I worked in close cooperation with the ECTA RC coordinator (Ms. Rose-Marie Pype, my tutor) on the follow-up of the ECTA RC plan that includes updating the database, collection of data, initiation of reporting, translations, preparation of meetings, contribution to the launch of the new website.

1.2.2 Tasks and Responsibilities

New ECTA website: In the first weeks of the internship I was also in charge of comparing the current website of ECTA (www.ecta.be) with the new website, still in construction. The objective of this task was to identify the similarities and differences between the two websites in order to improve the website under construction. I was in charge of drawing the map for this website, based on the information that was in the previous website. I gathered together all the important standard documents that are to be posted in the website, these documents are concerning ECTA's structure functioning rules, about Responsible Care and the working groups and statistical information that ECTA receives from Cefic. During my internship it was decided not to proceed with the new website. It was decided that another new website with up-to-date contents will be created.

Meeting attendance: I attended several meetings to be aware of the new trends in transport related issues.

- 3rd of November 2009: "Can the EU prioritize road safety in the Member States?" organized by the Forum of Automobile and Society in the Bavarian Representation.
- 18th of November 2009: "Meeting Europe's Road Transport Challenge: What role for Autogas" breakfast round table organized by the Parliament Magazine in the European Parliament.
- 2nd December 2009: "Europe Road Safety Action Programme 2011-2020: Public Consultation Results" organized by the European Commission in the European Commission building.
- 11th March 2010: "Policy Dialogue – ICT for a green economy" organised by the European Policy Centre (EPC), to present the new discussion paper written on the topic ICT for a Green Economy. I had to write a report on this event to present to Mrs. Demeestere.
- 18th of March 2010: "EuroTra Board of Directors". I attended the meeting and had to write a report about the event to present to Mrs. Demeestere.

<u>Responsible Care companies:</u> I was responsible to manage the information concerning the RC companies. The information is stored in two locations: the association's database under the title of ECTA RC and a depository. My main task was introducing the input information coming from the other companies or from my supervisor in both locations and make all the necessary changes in order to maintain a clear and precise record of all available information. When dealing with official documents within a company, I had to address both the structure and the substance of the materials with the objective of achieving a meticulous explanation of the entire process, this way it is easier to understand and apply the procedures.

The depository contains the folders that represent all the companies that have signed or are in the process of signing the RC agreement. Each folder contains a checklist with all the information that needs to be collected from each company in order to become a RC member, it also contains a list of all the sites belonging to the mother company and that need to pass an SQAS assessment every three years. Each folder also has an Excel table containing the number of the SQAS report and some key figures, there are some specific questions in the SQAS report that need to be checked. The folders also contain the general correspondence between ECTA and the company and all the relevant information should also be inserted in the database. Another section of the folders contains the Improvement Plan, followed by the SQAS reports themselves. The last two sections of each folder contain the CEO's commitment to the RC programme as well as the contract and an example of the use of the RC logo by the company.

I was in charge of keeping all the folders up to date and of contacting the Responsible Care coordinator when the information about a company was not complete and when a SQAS report was reassessed. When ECTA was granted access to a new report, I had to actualize all the information concerning that report, insert the register of a new SQAS report in ECTA's database in case of a new location or compare a reassessed report with the previous one.

During my internship period four companies that were ECTA members decided to join the Responsible Care agreement. I followed the verification procedure for three of the companies. The verification procedure consists first of all in contacting the company CEO to get the information about the RC Coordinator (name, contact details and

position in the company, normally is the Health and Safety Manager). After this I had to contact the future Responsible Care coordinator to ask information about the contact details of the mother company, which is the company (with contacts) to invoice, who is going to sign the contract and the CEO commitment (normally is the CEO because Responsible Care is a top-down policy), the emergency phone numbers of all the company sites. Finally and most important, I had to gather all the SQAS reports with the contact and exact address of each site. After verifying all the information, it is important to check the most important questions in the SQAS reports, these questions should be marked with a positive answer or in case of a negative answer the comment of the assessor should be checked. For example, if the legislation is different between countries, some companies can be applying the legislation required in their countries and this might be not enough to have a positive answer in the SQAS report. Thus, the negative answer should not be considered as a failure to access the RC programme.

After this procedure, the company is ready to sign the RC Programme and the CEO commitment. I was in charge of preparing the contract (a standard contract exists, but I had to introduce in the contract the information about the specific company) for entering the RC programme and the CEO commitment and of sending these documents to the company for them to be signed by the CEO. After receiving the documents signed back, I had to store one copy of the RC contract and the CEO commitment in the company folder.

Improve the Guidelines for the ECTA RC Process. One of my tasks was to improve the Guidelines about the process for an ECTA member company to become a RC member company. There is a double aim in these guidelines: to make the learning process quicker and easier and to improve the standardized procedure that will facilitate the work during the internship period. These guidelines were started by a previous intern and each intern since then has the task of improving the guidelines according to his/hers experience in ECTA.

Turnover and people on payroll: I checked the websites from the companies in the organization database to collect information about the turnover and people on payroll (FTE) per company. The objective is to compare the information on the websites with the one that we have in the database, to make sure that the invoices are sent properly.

Update the SQAS reports and the folders of the companies. Every company is obliged to do a SQAS evaluation from all his SQAS addresses once every three years. My task was to identify the reports that have expired and get the new report that replaces the expired one. I also had to identify and get the access to new SQAQ reports that are normally related to a new site from a company. After having access to the reports, I had to compare some questions that are considered to be the most important ones. This comparison has the objective of checking the improvements/deteriorations experienced by the RC company.

Document preparation for the Board Meeting: a Board meeting took place on the 2nd of March during an EPCA/ECTA conference in Budapest. I was in charge of preparing the following documents to be acknowledged and approved: evaluation of the Steering Group (document containing all the attendances to the meetings in 2009, and a summary of the main topics and subsequent discussions), the status of the RC membership (number of companies and their names, the responsible care coordinator and the number of sites per company) and the ECTA Improvement Plan for 2010 (goals to achieve in 2010; to prepare this document I based myself in some ideas that Mrs. Pype presented on a ECTA meeting in the end of 2010). The KPI Form and KPI Guidelines that were discussed during the Steering Team meeting were approved by the Board.

After the approval by the Board of the KPI documents I had to send these documents together with the ECTA Improvement Plan for 2010 to all the Responsible Care coordinators and request them to fill in the KPI Form, their Improvement Plan for 2010 and their evaluation from the Improvement Plan for 2009. When I left ECTA just a couple of companies had sent the requested documents. The purpose of collecting the KPI Form is to make a statistical study with the Responsible Care companies.

Collecting documents from ECTA conference in Berlin: I was also in charge of collecting all the documents already done for the report on the ECTA conference in Berlin in October 2009. I had to contact the speakers in the conference for them to acknowledge and approve what the ECTA's (hired) journalist wrote about their speeches and is going to be published in the ECTA Conference Report. After collecting the documents and when I received the approval from the speakers, I gave all these

documents to the ECTA's communication responsible, to build a Report based on the abovementioned documents.

Translations: I translated the Guidelines "Behaviour Based Safety: Guidelines for safe driving of road freight vehicles" to Portuguese. These guidelines were written in English by ECTA, EPCA and Cefic in October 2003 and translations are available in ECTA website in the following languages: English (original), French, Dutch, German, Italian, Polish, Spanish and Swedish. Soon they will be available in Portuguese.

Collect ECTA documents for the 2009-2010 Fact Book – Fact, Policies & Procedures. I collected the documents of ECTA Annual Meetings and ECTA Publications from 2009 to be included in ECTA Fact Book that will be presented to the Board Members in the next Board Meeting.

Collect press articles about ECTA and ECTA RC programme.

Check the use of the RC logo in the companies' website to control the correct use of the RC logo.

1.2.3. Organizing the ECTA RC Steering Team Meeting

Develop the KPI form for the Steering Team meeting: By far, my biggest challenge and responsibility was organising the RC Steering Team meeting. First, I developed the KPI technical specifications and the KPI excel sheet according to what has been discussed in previous ECTA RC Steering Team meetings. These documents were discussed during the ECTA RC Steering Team Meeting. One of the points in ECTA's Improvement Plan for 2010 is the collection of KPI's that are considered to be appropriated to test the performance in critical areas related to Responsible Care (health, safety and environment). As a starting point for discussion it was used the KPI form which is listed in the "ECTA Responsible Care Programme and Implementation Guide" as it is according to Cefic's requirements. During the three Steering Team Meetings in 2009, it was discussed how to improve this Form and what to include in the Guidelines to be

distributed to the Responsible Care member companies. My task concerning the KPIs was drafting the final version of the KPI Form that is to be filled in by the Responsible Care companies and drafting the Guidelines that have the explanations on how to fill in the Form correctly.

Improvement Plan: I had to classify the actions in the Improvement Plan from the companies according to the points in the CEO's commitment. I used, as a stating point, a file done by the previous intern and the CEO commitment. The first document produced was not neutralized[11], so I had to create another document with the same format (actions divided for nine points) where the actions are neutralized.

After I finished the document with the Improvement Plan actions in the neutralized format, I made a summary of the most common actions and I had to create clusters to classify the actions. The actions are classified into five categories and some of them have subdivisions. This structure gave ECTA a better overview of the main concerns of the RC companies and the areas that they are willing to improve. All these documents were also discussed during the Steering Team Meeting.

The Steering Team is an advisory group composed by seven persons, Ms. Pype representing ECTA and six Responsible Care coordinators considered to be experts in health and safety and environment issues. The Steering Team is responsible to give advice and help the Responsible Care coordinator of ECTA to prepare documents concerning Responsible Care implementation. The Steering Team was created in 2009 and three meetings took place this year. I was responsible to organise the first meeting of 2010. For this meeting I was responsible to contact the members of the ECTA RC Steering Team meeting to set a date for the meeting. Out of seven people a quorum of five is needed. The meeting was firstly set for the 8th of January 2010. Due to the sickness leave of Mrs. Pype, I had to cancel the meeting and set a new date. The meeting was then set for the 11th of February. As Mrs. Pype was not able to attend the meeting, I was responsible for inviting another member to chair the meeting, prepare the agenda and write the minutes of the meeting. The main topics discussed during the

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[11] A neutralized document does not have references to companies so, in a neutralized document, it is not possible to identify companies.

meeting were: the KPI form and KPI guidelines that were considered to be good to be submitted to the Board, the Improvement Plan documents and an ECTA presentation.

Concerning the Improvement Plans, I was in charge of gathering the opinions from all the Steering Team members relating to the points that they considered to be the most important ones inside each subtopic, in order to make a synthesis of the main points. Concerning the ECTA presentation, I was responsible for making a single presentation about ECTA, having as a starting point three presentations that were given in ECTA previous meetings and the comments from the Steering Team.

1.2.4. Comparison between SQAS and US certification

I was in charge of making a comparison between SQAS and US Certification in order to identify the main similarities and differences between the two systems. To become an ECTA member the companies must be SQAS assessed. SQAS (Safety & Quality Assessment System) is a system to evaluate the quality, safety, security and environmental performance of Logistics Service Providers (LSP's) and Chemical Distributors in a uniform manner by single standardised assessments carried out by independent assessors using a standard questionnaire. This ensures consistency and avoids duplication of assessments. An SQAS assessment does not lead to a certificate but offers a detailed factual report that each chemical company needs to evaluate according to its own requirements. Cefic, the European Chemical Industry Council, centrally manages the system and ensures its integrity and success. The system is based on four pillars:

- A common questionnaire for each category of companies.
- The accreditation of assessors.
- The electronic database of assessment reports.
- The Service Group.

Cefic has developed five specific SQAS questionnaires for the different types of LSP active in land logistics and one for chemical distribution, in close co-operation with the

involved partner companies and their associations. Each industry sector (transport, cleaning, warehousing, etc) can be assessed with a common questionnaire. SQAS avoids multiple assessments by different individual chemical companies at the same logistics company, which prevents duplication of efforts and saves resources at both ends. The American Chemistry Council (ACC)[12], an industry trade association for American chemical companies, defines that companies must be assessed through RC14001, which combines a Responsible Care Management System (RCMS) and ISO 14001 certification into a single, more cost-effective process.

Responsible Care Management Systems:

Responsible Care is a management system approach that was implemented in the U.S. by the ACC, and includes mandatory independent third-party certification. The management system approach leads companies to achieve even higher standards of performance and greater value for their business. A Responsible Care management system includes requirements for policy and leadership, planning, implementation, operation and accountability, performance measurement and corrective actions, and management systems review. A key part of the Responsible Care management system process is mandatory certification by an independent, accredited auditor. All the companies taking part in the Responsible Care initiative at ACC undergo headquarters and facility audits to assure that they have a structure and system in place to measure, manage and verify performance. All Responsible Care companies are required to renew their certification every three years.

A Responsible Care management system offers an integrated, structured approach to drive results in seven key areas: community awareness and emergency response; security; distribution; employee health and safety; pollution prevention; process safety; and product stewardship. The Responsible Care management system framework is simple, building on a basic plan-do-check-act philosophy that raises the bar for industry-wide performance while allowing flexibility to meet the specific needs of

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[12] The American Chemistry Council (ACC) is in charge of improving the public image of the chemical industry. The trade group represents US Chemical Companies as well as the plastics and chlorine industries, formerly known as the American Plastics Council, the Center for the Polyurethanes Industry and the Chlorine Chemistry Council.
The ACC implemented the Responsible Care programme in 1988. At least 52 countries have implemented this initiative. It is managed at a global level by the International Council of Chemical Associations.

individual companies and facilities. The Responsible Care management system is based on effective and proven management practices. It combines the practices of leading private-sector companies, the International Standards Organization and federal regulatory requirements.

The Responsible Care management system process begins with a strong commitment from company leadership. Senior management is called upon to develop, document and implement a policy that establishes a company's framework for defining and reviewing its goals and objectives. Inherent in this framework is a commitment to continual improvement.

ISO 14001:

ISO 14001 is family of management system standards addressing environmental management issues, developed by the International Standards Organization (ISO). ISO 14000 series is concerned with how an organisation's activities affect the environment through the lifetime of the product, including pollution, waste generation, energy use, noise and reduction of natural resources. ISO 14000 standards also provide significant tangible economic benefits including reduced raw material/ resource use, reduced energy consumption, improved process efficiency, reduced waste generation and disposal costs, utilization of recoverable resources. The ISO 14000 family is designed to be implemented according to the same Plan-Do-Check-Act (PDCA) cycle underlying all ISO management systems standards.

2.   QUALITY AND SAFETY MANAGEMENT SYSTEMS

This section of the report is devoted to a theoretical study on the Quality and Safety Management Systems. This will allow us to make a comparison between theories and practise (what ECTA is creating) in the conclusions section of the report.

First, I will define quality and safety. Then, a definition of management systems is presented to help in the description of the structure of Quality and (then) Safety Management Systems together with certification schemes. Finally, the importance of the performance indicators is described and then I will make a description of some quality and safety indicators.

2.1.   Definition of Quality

Profitability has three components: productivity, cost and quality (Evans and Lindsay, 1993). From these three components, quality can be the most important factor in determining the success or failure of a company in the long-run. The high quality of its products and/or services can give a company a competitive edge; good quality helps reducing costs due to returns, rework and scrap and increases productivity, profit and other measures of success. Customer demands increase over time with a special emphasis to quality requirements. Another reason for the rise of quality concerns is the growing supply of products and services from low labour cost countries at a very competitive price. Quality should be one of the main priorities of the companies as it is a key driver to success.

Quality assurance refers to any action directed toward providing consumers with products (including goods and services) of appropriate quality. (Evans and Lindsay, 1993)

Yet, nowadays Quality is more than any kind of assurance scheme, regardless of their importance. It is a management philosophy committed to continuous improvement

through employee participation, with the main purpose of better satisfying their customers (Kanji, 1998).

Total Quality is a major factor in the business quality revolution that has proven itself to be one of the 20th century's most powerful creators of sales and revenue growth, genuinely good new jobs, and soundly based and sustainable business expansion.[13]

Total Quality Management is a business practise that recommends the development of methods and processes in a way that they cannot be copied by the competitors. TQM can, thus, be defined as "the mutual cooperation in an organisation and associated business processes to produce value-for-money products and services which meet and hopefully exceed the needs and expectations of customers." (Dale, 2003)

<u>What is Quality?</u>
Quality can have multiple interpretations, uses and definitions. The international definition of quality defined by ISO9000 (2000) is the

"degree to which a set of inherent characteristics fulfils requirements"

The definition of quality as conformance to agreed and fully understood requirements is attributed to Crosby, as he defines quality as an attribute, meaning that a product or service is in conformance to requirements or it does not. In this context, quality is a characteristic which is judged to be correct or incorrect when compared to a standard or reference point.

Crosby emphasises that the requirements are the actions required to make a product and/or deliver a service that meets the customers' expectations, and it is the management responsibility to make sure that the appropriate requirements are created and specified within the organisation. This definition of quality is useful to develop the Service Level Agreements (SLAs)[14] in an internal customer-supplier relationship.

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[13] Feigenbaum and Feigenbaum (1999) in *Managing Quality* by Barrie G. Dale

[14] A service level agreement is a part of a service contract where the level of service is formally defined. In practice, the term is sometimes used to refer to the contracted delivery time (of the service) or performance

Five different approaches to define quality can be mentioned (Evans and Lindsay, 1993):

- Transcendent definition – normally is used by general population and is a synonymous of superior or innate excellence. Quality is absolute and universally recognisable and it is associated to an evaluation of features and characteristics of products. In this approach, quality cannot be exactly defined but can be recognised through experience and cannot be measured, compared, or analysed.

- Product based definition – according to this point of view, quality is a precise and measurable variable and the differences in quality are caused by the differences in quantity of some product attribute.

- User based definition – quality is defined as "fitness for intended use" meaning how well the product performs its intended function. It is assumed that quality is established by the customer wishes and the price that he is willing to pay for the product. To determine the fitness for use, the product's intended use, the frequency of use, the cost, performance, reliability and service requirements should be considered. . Both internal (individual or department who performs the next operation) and external (ultimate purchaser of a product and/or service) customers should be considered. This definition was firstly used by Juran in 1988, and he organized "fitness for purpose/use" into the categories of quality of design, quality of conformance, abilities and field service. He focused on fitness or use helps to prevent the over-specification of products and services. The over-specification can add greatly to costs and tends to be against a right-first-time performance. It is the responsibility of the purchaser, customer or user to judge how well fit a product or service for use.

- Manufacturing-based definition – quality is viewed as an outcome of engineering and manufacturing practises, or as "conformance to specifications" The targets and tolerances that are determined by the product and service designers are the specifications and the ideal values that the production should meet are the targets. The tolerances are defined because it is recognised that it is impossible to meet all the targets at the same time. This definition is used in the context of the technical aspects of quality control.

- Value based definition – in this approach, quality is viewed in terms of costs and prices, in other words a quality product is seen as the one that provides performance at an acceptable price or conformance at an acceptable cost.

Quality can also have the purpose of satisfying the customer expectations and understanding their needs and future requirements. With this purpose, quality can be defined as "the attributes of a product and/or service which, as perceived by the customer, makes the product/service attractive to them and gives them satisfaction" (Dale, 2003). As all organizations are dependent on having their customers satisfied, the basis of TQM is satisfying the customer and creating customer enthusiasm through understanding needs and future requirements (i.e. customer orientation). A customer focused organisation places some effort in anticipating the customers' expectations. This can be accomplished by getting and maintaining a long-term relationship with the customers (companies listen to their customers that are the real users of the product and/or service so they can have a clear perspective on customers' experiences). The aim is to manufacture quality into the product and/or service as upstream as possible.

The customer-required quality should be adjusted to the internal needs and communicated to all levels in the organization hierarchy. The customer needs and requirements must be measurable, realistic and achievable and in this respect the use of quality function deployment (QFD) is useful. As an organization is dependent on customer needs and requirements, the organization must update constantly its knowledge about their customers. Customer complaints can also be regarded as a customer satisfaction indicator. Even if complaints reflect dissatisfaction their proper management can have a positive impact on customer perceptions.

The view of quality control on itself has evolved. If, at the beginning, a product had quality if their parameters were between the specifications and tolerance limits, Taguchi has clearly shown that only at the target is quality totally achieved. The idea of reducing the variation of part characteristics and process parameters for them to be centred around a target value is attributed to Taguchi. According to Taguchi (Dale, 2003):

"the quality of a product is the (minimum) loss imparted by the product to the society from the time the product is shipped."

This can be defined by a quadratic loss curve. Taguchi includes in the losses time and money spent by customers, consumers' dissatisfaction, warranty costs, repair costs, wasted natural resources, loss of reputation and, in the end, loss of market share.

The modern view of quality control is related to Six Sigma, which is a statistical indication of variation and parts per million defects. The statistical indication (sigma) is a sign of how good a product or a service is. The higher the sigma value the lower the number of defects. This methodology was created as an approach to improve productivity and quality and to reduce costs being a way to search for perfection. The main features of the Six Sigma methodology are training commitment in statistics and statistical tools, problem solving methodology and framework, project management, a team-based project environment, people who can successfully carry out improvement projects, leaders and project champions.

Another point to consider is the difference between quality of design, that is the degree to which the design of the product and/or service achieves its purpose, and quality of conformance which is how well the product and/or service conforms to the design. These approaches of quality are not exclusive. In a company quality can and need to be viewed from different perspectives as all the stakeholders matter and all of them have different goals and value quality attributes differently.

Yet, within a company there must be an agreed definition of quality in order to avoid confusion and be sure that everyone, independently from department and function, is focused on the same objectives.

Although there are some different definitions of quality, they all focus on meeting requirements and specifications or satisfying and delighting the customer. The eight principal quality dimensions were listed by Garvin[15] to help explaining the different definitions of quality are:

- Performance – product's primary operating characteristics.

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[15] David A. Garvin, "Product Quality", pp. 29-30; consulted in the book "The Management and Control of Quality"

- Features – the "bells and whistles" of a product.

- Reliability – the probability of a product's surviving over a specified period of time.

- Conformance – the degree to which physical and performance characteristics of a product match pre-established standards.

- Durability – the amount of use one gets from a product before it physically deteriorates or until replacement is preferable.

- Serviceability – the speed, courtesy, and competence of repair.

- Aesthetics – how a product looks, feels, sounds, tastes, or smells.

- Perceived quality – subjective assessment resulting from image, advertising, or brand names.

2.2. Definition of Safety

Safety Management is a core business function as financial management, HR management, etc. The Safety Management System is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures. Three core aspects of a SMS are (Bangalore International Airport Limited, 2007):

- Systematic – safety management activities are in accordance with a pre-determined plan, and applied in a consistent manner through the organisation.

- Pro-active – an approach that emphasizes hazard identification and risk control and mitigation before events that affect safety occur.

- Explicit – all safety management activities are documented and visible.

All companies desire to eliminate all accidents and especially serious incidents. But this is an impossible goal as failures and errors will occur despite all the efforts to avoid them. As no human activity or human made system can be guaranteed to be completely safe, the notion of risk is always present in a system that is considered to be safe. Safety

is commonly seen as the management of risks. The International Civil Aviation Organisation (ICAO)[16] defines safety as:

"Safety is the state in which the risk of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management."

As well as for quality, the concept of safety can have different meanings depending on the perspective of the person who is defining it:

- Zero accidents (or serious injuries), this is a perspective that is common of the general public.
- Freedom from danger or risks, meaning the factors that cause or can cause accidents.
- Attitude towards unsafe acts and conditions by employees (this reflects a safe corporate culture).
- The degree to which the inherent risks in the business are "acceptable".
- The process of hazard identification and risk management.
- The control of accidental loss including persons, property and damage to the environment.

In the management of safety, there is the need to differentiate between safety programs and safety management systems (Bangalore International Airport Limited, 2007):

- Safety Programme is an integrated set of regulations and activities aimed at improving safety and include safety activities intended to fulfil the programme's objectives. Apart from regulations and directives for conducting operations safely, the safety programme must include incident reporting, safety investigations, safety audit and safety promotion.
- A coherent safety management system (SMS) is required to implement the safety programme in an integrated way. A SMS is an organised approach to

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[16] ICAO is a specialised agency of the United Nations that codifies the principles and techniques of international air navigation and promotes the planning and development of international air transport to ensure safe and orderly growth.

manage safety and includes the necessary organisational structures, accountabilities, policies and procedures. As minimum requirements, a SMS should include the identification of safety hazards, ensure that corrective actions that are necessary to minimize the risks and hazards are implemented and should provide continuous monitoring and regular assessment of the safety level achieved.

There are two approaches to safety management (International Civil Aviation Organization, 2006):

- Traditional perspective – this approach to safety management reacts to unwanted events by prescribing measures to prevent recurrence and tries to make sure that the minimum standards are met. This perspective does not define best practices or standards. This approach worked well until the end of the 1970s, but accidents continued to occur although the numerous rules and regulations.

- Modern perspective – modern safety management practices are changing from a reactive approach to a proactive mode meaning that some other factors, apart from legislation, regulatory requirements and fulfilment of the requirements, are also considered to be effective in managing safety. As examples of factors to be considered can be mentioned the application of scientifically-based risk management methods; the senior management's commitment to the management of safety; a corporate safety culture that promotes safe practices, supports safety communications and actively manages safety with the same attention to results as financial management; the successful implementation of standard operating procedures (SOPs)[17] including the use of checklists and briefings, a non-punitive environment or culture to promote effective incident and hazard reporting; systems to collect, analyse and share safety related data arising from normal operations; competent investigation of accidents and serious incidents identifying systemic safety deficiencies; integration of safety training for operational personnel and sharing safety lessons learned and best practices through the active exchange of safety information and systematic safety

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[17] A Standard Operating Procedure or Standing Operating Procedure (SOP): A set of instructions covering those features of operations which lend themselves to a definite or standardized procedure without loss of effectiveness. The procedure is applicable unless ordered otherwise.

oversight and performance monitoring aimed at assessing safety performance and reducing or eliminating emerging areas.

Quality is applied to processes, products and services. Good safety procedures are essential to ensure high standard of quality of processes, products and/or services. Safety problems will also be reflected on higher quality costs, associated with nonconformities. Moreover, both the management of quality and the management of safety require the existence of a clear organisational structure with assigned tasks and responsibilities.

2.3. Management Systems

Management systems are important to guarantee quality and safety. Companies need to be managed in a systematic and transparent way. Implementing and maintaining management systems can lead a company to success. With a management system, a company can continuously improve its performance and maintain the expectations of its stakeholders.

2.3.2. What is a Management System

A system is a set of interrelated or interacting elements. Management is the coordination of activities to direct and control an organisation. A management system is a system to establish policy and objectives and to achieve those objectives (ISO, 2000).

A system approach to management consists in identifying, understanding and managing interrelated processes as a system contributes to the organisation's effectiveness and efficiency in achieving its objectives. Any system consists of a number of components that are the organisational structure, responsibilities, procedures, processes and resources necessary for implementing the management system. These components

should be working together in a proper way in order to accomplish the main purpose of the system.

2.3.2. *Structure of Quality Management System and Certification*

Quality management, at least in one of its stages, is the coordination of activities to direct and control an organisation with regard to quality. A Quality Management System (QMS) describes how a company operates. The system should include policies and procedures and supporting documents like forms, templates, flowcharts and training manuals. The policies and procedures should be complete, applied, understandable and consistent with the current practice. The QMS describes how policies and procedures are developed, documented, approved, implemented and regular reviewed through self-review. The policy of the company states the position or viewpoint of the company on a subject and the procedure explains how the policy is to be implemented.

A QMS should be developed as a management tool for the organisation and should reflect the organisational structure, culture and the way education and training is delivered. The company can choose how it designs the QMS as it should be appropriate to the size, nature and complexity of the company.

A Quality Management System should be (New Zealand Qualification Authority, 2007):

- Coherent – The QMS should reflect the company's structure and purpose to provide assurance that it will be workable in practice. It should be coherent, logical and well structured. The policies, procedures and documents should be referenced using a document ID system and should be controlled to make sure that information is correct and up to date.
- Coverage – the QMS should cover all aspects of the organisation's operations and it should not be limited to the way the company plans to meet relevant standards and legislation requirements. It is desirable that the QMS has a reference to any standards and legislation to ensure full coverage.

- Review – as companies are constantly changing and evolving, the QMS has to be regularly reviewed to make sure it remains current. The way review is done depends on the size and nature of the organisation, but most important is that there is a review plan and that it is done regularly an improved outside of formal review cycles.

- Accessibility and usability – one of the primary goals of the QMS should be usability. QMS is considered to be the document that everyone should be able to reference for information on procedures. It should be physically and electronically accessible and staff should know how to find the sections that are relevant to them. Staff should be encouraged and have a way to provide feedback in case they find an error or if they have any suggestion to improve a process. A QMS should be simple in structure but it should be able to explain to carry out important procedures.

The adoption and development of a quality management system should be a strategic decision of an organisation and is influenced by varying needs, particular objectives, the products provided, the process employed and the size and structure of the company. To increase customer satisfaction by meeting customer requirements, the company should adopt a process approach to develop, implement and improve the effectiveness of a quality management system. The process approach has the advantage of ongoing control that the process approach provides over the relation between the individual processes within the system of processes as well as over their combinations and interaction. This approach has following advantages when used in a quality management system (ISO, 2000):

- Understanding and meeting requirements.
- The need to consider processes in terms of added value.
- Obtaining results of process performance and effectiveness.
- Continual improvement of process based on objective measurement.

The model of a process-based quality can be applied to the quality management system. In this model, customer has an important function in the definition of the requirements as inputs. Customers require products that satisfy their needs and expectations that are

expressed in product specifications and are referred to as customer requirements. The monitoring of customer satisfaction needs the evaluation of the information provided by the customer (customer's perception), to evaluate if the company has met the customer requirements. In addition to this model, the methodology identified as "Plan-Do-Check-Act" (PDCA) can be applied to all processes (ISO, 2000):

- Plan is the establishment of the objectives and processes necessary to deliver results in accordance with customer requirements and the company's policies.
- Do is the establishment of the processes.
- Check is the monitoring and measuring processes and product against policies, objectives and requirements for the product and reporting the results.
- Act is taking actions to continually improve processes performance.

All the activities that use resources to transform inputs into outputs can be considered a process. As the output of a process can be the input for another process, a company has to identify and manage all the interrelated processes. The identification and management of interrelated activities is referred as process approach. A model of a process-based quality management system is presented below.
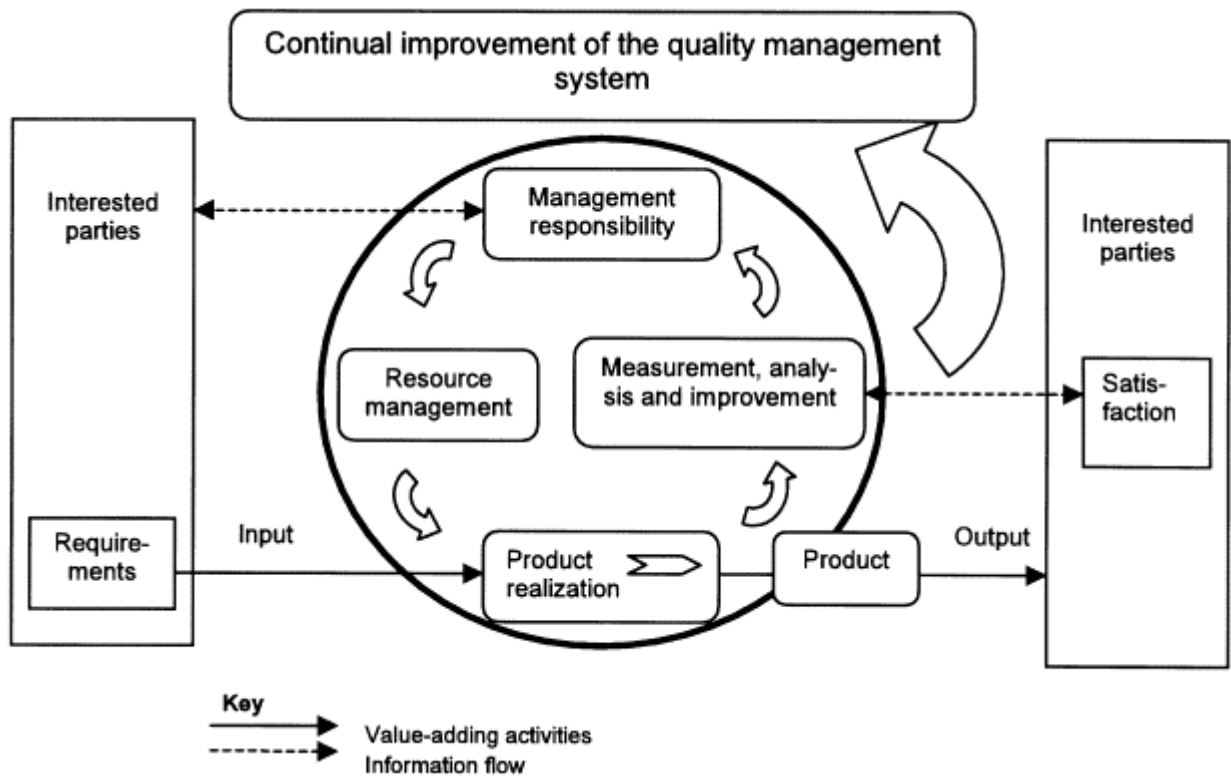
Source: ISO, 2000

A Quality Management System enables the company to have a structure for continual improvement in order to enlarge the probability of increasing customer satisfaction and also the satisfaction of other interested parties. A QMS gives confidence to the company and to its customers that he company is able to provide products that constantly fulfil the requirements.

To build an effective Quality Management System, the company must:

- Identify the processes needed for the quality management system and their application through the company.
- Determine the sequence and interaction of these processes.
- Determine criteria and methods needed to make sure that the operation and control of these processes are effective.
- Ensure the accessibility of resources and information necessary to support the operation and monitoring of the processes.
- Monitor, measure and analyse these processes.

- Implement actions necessary to accomplish the planned results and continual improvement of the processes. The purpose of continual improvement is to increase the probability of increasing customer satisfaction.

Documentation facilitates communication of intent and consistency of action and it contributes to the achievement of conformity to customer requirements and quality improvement, provision of appropriate training, repeatability and traceability, provision of objective evidence and evaluation of the effectiveness and continuing suitability of the Quality Management System. Within the documents that are needed for a Quality Management System there must be (ISO, 2000):

- Documented statements of a quality policy and quality objectives.
- A quality manual – should be established and maintained by the company and includes the scope of the quality management system with details of and justification of exclusions, the documented procedures established for the quality management system or a reference to them and a description of the interaction between the processes of the quality management system.
- Documented procedures – the procedures must be established, documented, implemented and maintained.
- Documents needed by the organisation to ensure the effective planning, operation and control of the processes. The documents have to be approved prior to use to guarantee that they are adequate and they need to be reviewed, updated and re-approved.
- Records must be established and maintained to provide confirmation of conformity to requirements and of the effective operation of the quality management system. The records must be easily identifiable, they should be properly stored and protected and it should be easy to recover them.

The extent of the quality management system documentation is different between companies and depends on the size of the company and type of activities, on the complexity of processes and their interactions and on the competence of personnel.

Concerning the responsibilities with the quality management system, top management should be committed to the development and implementation of the Quality Management System and continuously improve its effectiveness through the communication to all company of the importance of meeting customer (customer focus) and regulatory requirements (ISO, 2000). Top management should create an environment in which everyone is involved through the promotion of quality policy and objectives in the company and in which the quality system can operate effectively. This enhances increased awareness, motivation and involvement. Top management is responsible for establishing the quality policy that must be appropriate for the company's purpose, for ensuing that quality objectives are established, for conducting management reviews and for ensuring the availability of resources. Top management must make sure that customer requirements are determined and met with the purpose of improving customer satisfaction. Top management is also responsible to guarantee that the quality policy is appropriate to the purpose of the company, includes a commitment to fulfil the requirements and continuously improve the effectiveness of the quality management system, provides a framework for establishing and reviewing quality objectives, is communicated and understood within the company and is reviewed for continuing suitability.

To evaluate a Quality Management System it is important to know if the processes are identified and appropriately defined, if the responsibilities are assigned, if the procedures are implemented and maintained and if the processes are effective to achieve the required results. The evaluation of the system can be done through audits to determine the extent to which the Quality Management System requirements are fulfilled. Audits can also be used to assess the effectiveness of the system and to identify opportunities for improvement. Audits can be (ISO, 2000):

- First-party audits – when they are conducted by the company for internal purposes and they are the company's self-declaration of conformity.
- Second-party audits – when they are conducted by customers of the company or on behalf of the customers.
- Third-party audits – when they are conducted by an external independent organisation that are accredited and provide certification or registration of conformity with the requirements.

Quality standards, certification and awards

The implementation of quality standards is a way to put into practice quality management. Quality standards are believed to be a way of creating a culture of excellence in a company (Kelemen, 2003). Some companies implement a quality standard due to institutional pressure or as a marketing strategy for potential customers, as a quality standard is a sign that customers can trust the quality of the product.

Quality standards are systems that permit a "conformance to requirements". For a quality system to be effective it must be developed in relation to a point of reference that is usually represented by a quality system standard. Most of the quality standards used nowadays have evolved from military standards. The international standards started to be developed in the 1980s by the British Standards Institute (BSI) and 20 countries took part in the development of the first international quality standard, the ISO 9000 series (Kelemen, 2003).

The ISO 9000 family of standards was developed to help companies of all types and sizes to implement and operate effective quality management system. ISO 9000 comprises (ISO, 2000):

- ISO 9000 that describes the fundamentals of quality management systems and specifies the terminology for quality management systems.
- ISO 9001 that comprises the requirements for a quality management system where an organisation needs to demonstrate its ability to provide products that fulfil customer and applicable regulatory requirements and intends to increase customer satisfaction.
- ISO 9004 that provides the guidelines that considers the effectiveness and efficiency of the quality management system. The purpose of this standard is improvement of the performance of the organisation and satisfaction of customers and other interested parties.
- ISO 19011 provides guidance on auditing quality and environmental management systems.

The advantages of the ISO 9000 standard series are divided into three categories (Kelemen, 2003). The standards are intended to improve work relations through encouraging knowledge sharing and acting as an efficient interpersonal communication tool. Second, the standards can lead to costs savings by helping to identify and eliminate waste. Finally, standards are said to lead to improved customer satisfaction through a reduction of errors and customer's complaints and to improve the image and reputation of the company.

It is also possible to list some of the limitations to the ISO 9000 standard series (Kelemen, 2003). Firstly, it is possible to mention the bureaucracy involved in the documentation and accreditation and the time needed to write and update the procedures and the certification documentation. Secondly, costs can be a limitation especially for small companies. Standards can also limit creativity, increasing the pressure to conform to the existing rationality of the organisation. In addition, the standard may fail to have impact on the quality of the product or service as they can be perceived to be an extra task instead of something inherent to the job. In this perspective, according to Dale's[18] (1994) guidelines for ISO implementation, there are some points to consider when implementing the ISO 9000 standard:

- The implementation of ISO 9000 must be managed like a project with clear objectives and time deadlines.
- The organisation must be clear on reasons it seeks certification.
- ISO certification should not be confounded with TQM; it is merely the first step towards a TQM culture.
- Commitment from top management is an essential ingredient: the establishment of a steering committee comprising all heads of department and chaired by the CEO should act as a major driving force.
- Training at all levels in the organisation must ensure that people understand the standard's foundation, methodology and procedures.
- An internal quality audit should be performed prior to inviting the external assessor in order to identify weaknesses and remedy them on time.

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[18] In *Managing Quality* by Mihaela L. Kelemen

Apart from the international quality certification norms there are other models to guide the companies in the implementation of quality. As an example of this models it can be referred the European Foundation Quality Management model.

The European Foundation of Quality Management (EFQM) is an organisation that promotes quality and excellence in Europe. For EFQM model is based on customer satisfaction, people satisfaction and impact on society being achieved through a leadership that can effectively drive policy and strategy, people management, resources and processes and leads to excellence in business results. It also highlights the importance of partnerships and the need for continuous learning and innovation focusing on management and knowledge sharing.

The EFQM model is non-prescriptive and recognises that there are different approaches to achieve sustainable excellence. The bases of this approach are (Kelemen, 2003):

- Results orientation as excellence is dependent of balancing and satisfying the needs of all stakeholders.
- Customer focus as the customer is the final entity that judges the product and/or service quality.
- Leadership and constancy of purpose. The behaviour of the company's leaders creates unity within the company and an environment in which the company and its staff can excel.
- Management by processes and facts. The company performance is more effective when all interrelated activities are understood and systematically managed and when decisions related with current operations are planned. This approach enables to make improvements using reliable information that includes the stakeholders' perceptions.
- People development and involvement. Shared values and a culture of trust and empowerment that encourages the involvement of everyone increase the potential of the company's people.
- Continuous learning, innovation and improvement based on the management and sharing of knowledge allows to maximize the organisational performance.

- Partnership development helps a company to work more effectively when the relationships are built on trust, sharing of knowledge and integration with the company's partners.
- Public responsibility is concerned with the long term interests of the organisation and its people are better served if an ethical approach to management is adopted and exceeds the expectations and regulations of the community at large.

EFQM model can be used in different ways. It can be used as a framework for developing organisations goals and objectives in a quantifiable and measurable way, as a framework that helps companies identifying and understanding the nature of their businesses, key linkages and cause and effect relationships. EFQM model can also be used as a basis to apply for the European Quality Award and as a diagnostic tool for assessing the current health of the organisation.

2.3.3. *Structure of Safety Management System and Certification*

Concerning safety, there are also norms and certification systems. The process to implement and evaluate a Safety Management System is similar to the one for a Quality Management System.

Need for safety management

Processes are becoming safer over time, although safety problems should not be ignored with the risk of increasing the number of serious accidents.

It is essential to be aware of the total costs of an accident or incident as they cost money and make bad business sense. An insurance can help disperse the costs of an accident over time and cover specific risks, but there are some costs that insurances do not cover. Additionally, some less tangible costs like loss of confidence of the consumers can harm a company.

Safety is always referred together with health. A health and safety management system (HSMS) includes the introduction of processes designed to decrease the incident of injury and illness in the employer's operation (Partnership in Injury Reduction Program[19], 1989). For the implementation of a health and safety management system to be successful it is necessary management commitment to the system, effective allocation of resources and a high level of employee participation. The extent and complexity of the HSMS will vary according to the size and type of workplace. The basic components of a Health and Safety Management System are (Partnership in Injury Reduction Partnership, 1989):

- Management Leadership and Organisational Commitment.
- Hazard Identification and Assessment.
- Hazard Control.
- Work Site Inspections.
- Worker Competence and Training.
- Incident Reporting and Investigation.
- Emergency Response Planning.
- Program Administration.

These elements are interdependent.

There are some definitions that must be acknowledged (Partnership in Injury Reduction Program, 1989; International Civil Aviation Organization, 2006):

- Hazard – A situation, condition or behaviour that has the potential to cause an injury or loss.
- Health Hazard – a physical, chemical, biological or psychological hazard which may cause acute or chronic health effects in exposed employees.
- Safety Hazard – a substance, process, action or condition which may endanger the immediate safety of employees.

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[19] First established in 1989 as the Partnerships in Health and Safety program, Partnerships in Injury Reduction (Partnerships) is a voluntary program designed to reduce losses caused by workplace injuries and illnesses. The program brings government together with industry and safety associations, employers, and the Workers' Compensation Board of Alberta (WCB) to encourage Alberta employers to build effective health and safety management systems.

- Hazard assessment – a process used to identify and evaluate the health and safety hazards associated with job tasks. Provides a method for prioritizing health and safety hazards.

- Hazard control – method used to eliminate or control loss.

- Accident – occurrence during company operations that comprises a fatality or serious injury and substantial damage to the company facilities or material.

- Incident – a preventable, undesirable and unexpected event that has the potential to result, in physical harm to a person or damage to property (loss or no loss). A serious incident is an incident involving circumstances indicating that an accident nearly occurred.

- Risk – a composite of the predicted probability and severity of each possible consequences of each identified hazard.

As well as an in quality management, in a Safety Management System the emphasis is in prevention and not just in the corrective measures. A Safety Management System can be defined as a management system that is used to manage all aspects of safety throughout an organisation. In other words a Safety Management System is the system of structures, responsibilities, and procedures within the overall management system that assures the safe operation of an establishment, with the appropriate resources and technological solutions available (International Civil Aviation Organisation, 2006; Bangalore International Airport Limited, 2007). It provides a systematic way to identify hazards and control risks while maintaining assurance that these risks controls are effective. A Safety Management System is intended to support that companies adopt a performance-based regulations which describe objectives and allow each regulate entity to develop its own system for achieving the objectives. The Safety Management System should include the part of the general management system which includes the organisational structure, responsibilities, practices, procedures and resources for determining and implementing the major accident prevention policy (European Commission, 1998).

Any Safety Management System is a part of the overall management system, the safe operation of an establishment that may be dependent on a management system developed for a larger entity as a company or group of companies. This is important as

the approach to implementation should be different between companies and the management system should be the reflex of the management philosophy, system and culture as appropriate for the workforce and the process technologies involved. The Safety Management System should be integrated with other management systems is the company.

Components of a Health and Safety Management System (Partnership in Injury Reduction Program, 1989):

1. **Management Leadership and Organisational Commitment**

   In an effective Health and Safety Management System, management shows leadership and commitment to the program. To accomplish this, the first step is to develop a Health and Safety Policy that contains the organisation's expectations on health and safety issues. An organisation's Health and Safety Policy should include a declaration of management's commitment to health and safety, the overall goals and objectives of the health and safety program, the general health and safety responsibilities of management, workers, contractors and visitors while at work site, a requirement to comply with applicable government legislation and a requirement to comply with the organisation's own health and safety standards.

   Employees should be involved in writing the policy and the senior-operating officer must indicate the commitment of management by signing and dating the document. All employees must be aware of the policy's contents and it should be notably posted through the work site and a copy should be added to the Health and Safety Manual. It is the responsibility of the management to communicate to the employees the company's health and safety policy. This policy should also be reviewed periodically and it also must be communicated to the subcontractors.

   Roles and Responsibilities
   Everyone in the company must be aware of their individual roles and responsibilities, so clearly defined and well communicated health and safety roles create an expectation of a standard level of performance and accountability

among employees, contractors and visitors. The specific health and safety responsibilities and goals can be written down in the job descriptions and contracts and they should be included in the performance reviews. Management expectations and the consequences of adopting health and safety responsibilities must be clearly communicated to all employees.

Management Commitment

One of the essential components of the management system is that management demonstrate their support to the health and safety program. Healthy and safe practices and behaviours should be at least annually communicated and reinforced to the entire workforce by the senior management. Safety should be integrated into all operations and management like any other company function.

Worker participation

Successful Health and Safety Management Systems have high levels of worker involvement and worker participation. In the development of the system is important to create ownership and overall buy-in into the system and will help to ensure a better fit with the organisational culture. To promote worker participation it is crucial to engage them in the development of hazard assessment, inspections, preventive maintenance, training, emergency response and incident reporting systems. Regular updates on the progress of system development should be done to keep everyone engaged and the feedback loop open.

Joint Worksite Health and Safety Committee

A Joint Worksite Health and Safety Committee is a group of worker and employer representatives working together to identify and solve health and safety issues at the work site. It offers employees the opportunity to be more involved in creating and maintaining interest in health and safety. Equal representation from all levels of the organisation should be included in the committee. This committee has the purpose of addressing health and safety matters that cannot be dealt with in the course of daily work, and it gives recommendations for improvement to site health and safety. The committee is responsible for recommending how health and safety problems might be solved.

<u>Legislation</u>

All relevant legislation and other health and safety information relevant to the operation must be available to employees at the work site. This allows workers to have access to the minimum requirements for conducting activities covered by legislation and to the information about their rights and responsibilities.

2. Hazard Identification and Assessment

The second step in the development of a Health and Safety Management System is the identification and assessment of hazards at the work site and together with leadership commitment forms the basis of a health and safety management system. It is important to proactively assess all jobs for hazards and the key personnel should be trained in the process of evaluating existing and potential hazards at the work site. Once again, involvement at all levels is important and it will make managers and workers aware of hazards before an accident occurs.

<u>Hazard Identification and Assessment Process</u>

This process has impact in other elements of the Health and Safety Management System and hazard assessment data can be used to develop other elements of a Health and Safety Management System including training and orientation (determination of workers training needs and create the content of employee orientations and job-specific training), work site inspections (use the assessment data as the basis for inspection checklists), emergency response (identification of areas that require emergency response plans) and incident investigation (assessment and control data is used to help determining if a system failure was the cause of the accident).

<u>Hazard Identification</u>

Occupational hazards are divided into two categories:

- Health Hazards: A health hazard may produce serious and immediate (acute) health effects or cause long-term (chronic) health problems. All or part of the body may be affected. Someone with an occupational illness may not recognize the symptoms immediately.

- Safety Hazards: A safety hazard is anything that could endanger the immediate safety of an employee, for example, a pinch point, crush, or burn hazard.

Hazard and Risk

The terms "hazard" and "risk" are often used interchangeably (and incorrectly). A hazard is a situation, condition, or behaviour that has the potential to cause an injury or loss. In contrast, risk is the chance of injury, damage, or loss and is usually expressed as a probability.

Imminent Danger

Some hazards are significant enough to present a situation of imminent danger. Imminent danger in relation to any occupation means a danger that is not normal for that occupation, or a danger under which a person engaged in that occupation would not normally carry out the work.

Sources of Hazards

There are many sources of hazards in a workplace, however, the three most likely sources that should be considered are:

- People: Lack of training, poor communication, rushing, fatigue, and other factors may cause at-risk behaviours.
- Equipment and Materials: Some equipment, tools and materials used in the job process are inherently hazardous, and others become hazardous over time due to inadequate maintenance, storage, or disposal.
- Workplace Environment: Factors such as facility layout, ventilation and lighting, walking surfaces, temperature and other variables can all be sources of hazards.

<u>Hazard Assessment</u>

There are two levels of hazard assessment:

- Formal hazard assessment is a complex undertaking and an important step in developing a Health and Safety Management System specific to a company. Formal hazard assessments will serve as the foundation of an employer's health and safety system, and involve the identification of all jobs and tasks performed by employees, the assessment of each task for hazards, and the prioritization of the hazards based on the level of risk. This process will be followed by the implementation of controls for the identified hazards. Key employees charged with conducting hazard assessments should receive training in how best to complete the process.

- Field-level hazard assessment is performed on the spot when unusual hazards may be introduced into the employee's work. A field-level hazard assessment is performed at the job site when hazards not considered in the formal hazard assessment could be introduced. All workers at the job site must participate in a field-level assessment with their supervisor. The field-level hazard assessment is conducted before work begins, and repeated at reasonable intervals if a new work process is introduced, a process or operation changes, or before the construction of significant additions or alterations.

<u>Reporting Hazards</u>

To support the hazard assessment process, employers must implement a system that requires workers to report any unsafe practices and conditions they identify at the work site. This can be done through the use of a safety suggestion box, or by designating a worker as the contact for safety concerns. Suggestions or ideas received should be addressed in a timely manner.

3. **Hazard Control**

After the hazard assessment, the next step in the development of a Health and Safety Management System is the implementation of control measures to eliminate or reduce the risk of harm to workers. Employers should take all reasonable steps to eliminate or control identified hazards in order to make the

workplace safer and should be aware if controls have been specifically prescribed for the jobs they do.

There are three categories of hazard control, and control methods are used in combination to make sure that the best level of worker protection possible. Independently from the control methods used, employers must have a system that allows regular checks to determine whether or not the controls are working as planned.

- Engineering is the best method of hazard control, and involves engineering out or substitution of the hazard. Where possible, engineering controls should always be the employer's first option. As an example it can be pointed out the replacement of a harmful chemical for a less hazardous product.
- Administrative controls are considered to be the second most effective method of hazard control, and involve the implementation of practices, procedures and rules to reduce the amount of exposure a worker has to the danger. As examples can be mentioned job rotation and providing emergency response training to all workers and conducting regular trainings.
- Personal Protective Equipment (PPE) is the method of last choice, and should always be used in combination with other control methods. Personal protective equipment is the easiest control to implement, but is the least effective. In some cases, employers will supply workers with the required PPE, and in others, they may require workers to provide it themselves. In all cases, formal training in the care, use, and maintenance of all PPE should be provided by the employer. As an example it can be mentioned the use of respiratory protective equipment to protect the lungs from harmful dusts and chemical vapours.

To implement measurement controls, it is also necessary to develop controls, to enforce them and to do preventive maintenance. To develop and implement hazards controls it is necessary to:

- Develop hazard controls – having as a starting point the results of the hazard assessment, it is necessary to select the tasks that present the highest risk to employees and determine the controls for the identified hazard, the input from the workers is essential as they have knowledge of the job tasks wit highest value to the process and it is a way to involve workers. Other sources of information are codes and standards, health and safety legislation, and existing company policies.

- Implement the controls – after developing the control it is necessary to implement it. This involves the installation of engineering controls, the development of policies, procedures, codes of practice, rules and preventative maintenance schedules, and the introduction of PPE. It also involves training workers and contractors in the use of controls, and the introduction of policies to enforce their use.

- Review and Revise – The controls should be assessed shortly after they are implemented to monitor for effectiveness. Successive and regular reviews should be carried out at least once a year to verify if the original expectations were correct and if the established controls continue to be appropriate. Re-evaluation of the hazards assessments and controls should be carried out every time there are changes in the operations or in the work that is being carried out.

To enforce the controls it is necessary to enforce control methods, develop a constructive enforcement policy, and communicate to employees the consequences and the steps that will be taken in case a non-conformance happens. Management and supervisors should be aware that positive reinforcement also goes a long way in encouraging safe and healthy behaviours at the work site.

A preventive maintenance policy and an equipment maintenance schedule should be developed and applied to avoid hazards caused by the breakdown of

equipment, tools and machinery. A preventive maintenance system helps reducing equipment breakdowns can cause injuries, property damage, and costly production delays and includes a requirement for workers to inspect their tools and equipment regularly.

4. **Ongoing Inspections**

A system for work site inspections is also a part of the Health and Safety Management System. Regular inspections have several advantages as:

- Proactively identify potential hazards that may not have been previously noted.
- Confirm the effectiveness of controls already in place.
- Demonstrate commitment to health and safety.

An inspection programme should define what to be inspected, who is involved in it, the frequency of the inspections and the responsible for corrective actions and follow-up. The inspection program provides information about the hazard assessment (in may require a revision), the efficiency of the preventive maintenance programs and if the employer training programs are appropriate. To develop an inspection program it is necessary to specifically identify what needs to be inspected, include a regular frequency for inspections in the inspection policy, determine who has the responsibility to conduct the inspections, provide training for the employees that need to participate in the inspection teams, make managers and supervisors responsible for ensuring that regular inspection tours are completed and place the inspection results and the expected timelines for the follow-up actions in a place that workers can see. A standard inspection form is a way to collect consistent results, allows the easy maintenance of inspections records and helps collecting data that can be analysed later for trends.

The inspections can be formal or informal. A formal inspection is conducted using a standard inspection form where the identified items are recorded and creates a consistent standard for collecting information. The inspection will look for unsafe situations, unsafe actions and health hazards and in the end an inspection report is written and reviewed. The items identified during assessment

should be reported and ranked in order of importance to prioritize hazards and be sure that the ones that have the highest danger potential are corrected first. Records of the inspection tours are important source of information, they can be used for future reference and statistical studies and employees should be able to have access to them. An informal inspection are made by workers, supervisors and managers, they do not incorporate a formal report and do not have a specific schedule. The results of an informal inspection should be worked on immediately, and the information is just recorded and reported if the situation requires it. Still inspection does not replace hazard assessment as they allow a systematic identification and assessment of the hazards, and the implementation of controls. Inspections are intended to examine the work site conditions, and to identify a hazard that was not identified in the formal hazard assessment.

5. **Qualifications, Orientations and Training**

   Worker training is a crucial element in a Health and Safety Management System and as employees should understand that, employers should communicate efficiently with their workers. Workers will perform their jobs safely and be more productive when they had the proper training. In most of the industries employees training is obligatory by law and it is the responsibility of the employer to make sure that the required training is completed. Contractor's qualifications should always be verified. There are two types of training:

   - Orientations – can be conducted in-house if the persons that are responsible for it are competent to carry out the task. As new and young workers experience have highest rates of injury, it is important to have a timely orientation. Orientations should be given during the first week of work and before the new employee starts working. Transferred or reassigned employees should also receive orientations before they start the new job to make sure that that person is aware of the new job and how to perform it safely and efficiently. Contractors should also have an appropriate training as well as visitors to the work site.
   - Job-specific training – In some situations, workers may also require a specific on-the-job training to be able to do their jobs in a appropriate, efficient and safe way. Employees are responsible to assure that the

training is given and that and who is going to provide the training and necessary supervision until the worker is considered competent.

Records showing that the training was given should be kept as it will help to track re-certification and refresher requirements accurately. Frequent refreshments of the training should also be provided to the workers by the employers.

6. Emergency response plan

As serious emergencies can affect the operation of a business and put the health, safety, and livelihood of many employees in danger and a good Health and Safety Management System cannot protect the company from all natural or unexpected disasters, having a good Emergency Response Plan (ERP) in place is essential to reduce the severity and risk of loss. If everyone is aware of what should be done and who to contact, it can save lives and reduce costs in case of a disaster. A response plan for an emergency (including rescue and evacuation) is required by law, it must have regular reviews and should be current.

To build an ERP we need to:

- Identify Potential Emergencies – this can be done through reviewing hazard assessment documents and the result of incident investigation, and by considering the potential of hazards around the facility. It assesses the potential of hazards in emergency situations. All types of hazards (work-related, natural disasters, man-made evens, technical failures) should be included in the ERP. The plan should fit in the worst case scenario. After the identification of the emergencies it is necessary to build a plan to deal with them, this should be communicated to all the company and it should be tested.
- Evacuation – an evacuation procedures for the work site should be developed, safety zones and gathering points for evacuation should be established.

- Communication – Specific communication systems for emergencies should be developed and emergency contact numbers should be posted in places that are most likely to be needed.

- Training – all employees should be trained for specific emergency situations because everyone should be aware of its responsibilities and know the basic emergency response information.

- Emergency equipment – should be available on the site and be maintained in a good operating condition. It should be positioned in accessible locations and should be inspected regularly.

- Disaster Services – can be contacted for some types of emergency. Disaster Services and emergency response agencies information should be on the ERP.

- Practices – must be done at least annually and for all types of emergency and should include all work areas and shifts.

- Records should be kept in all situations.

7. **Incident Investigation**

Unplanned and unwanted events that occur on the work site must be investigated as it can reduce the probability of the same incident happening again. A formal policy and procedure should reflect the importance of reporting all incidents as well as near misses, and workers should be trained in this issue. Management should actively promote incident and near misses situations reporting. Management should guarantee employees that investigations are focused on fact findings to search for causes and prevent a recurrence (can also be used to identify trends and allows the organisation to demonstrate commitment) and not on fault findings.

An incident reporting policy that includes a specific timeframe for reporting, a person responsible to collect the complaints, a standard report with details of the investigation should be written. In the incident report policy should be specified the requirements for reporting all incidents, workplace related illnesses and near misses. The company must also have a policy statement that describes the basic standards for the investigation of incidents in the workplace. It can be developed

together with the incident reporting policy, and includes the timeframe for investigations, the responsible for leading the investigation and the training required, a requirement for participation from all levels, the basic procedures to conduct the investigation, a requirement to identify indirect, direct and root causes, a requirement to identify corrective action, a specific person responsible for the follow-up and associated timeline for completion and a requirement for the senior management review and sign when the investigations are completed and the follow-up actions has been taken to prevent a recurrence of the incident.

Employees should be aware of the investigation policies and procedures; they also should have access to the investigation results. Communication of the results is crucial to prevent a similar occurrence in the company.

8. **Program Administration**

It ensures that all the aspects of an operation's Health and Safety Management System are recorded, tracked and maintained. A system that allows record tracking should be in place, in order for the company to be able to do statistical analysis and identify trends that might identify areas for improvement. Everyone should be involved in the management system and should have the opportunity to give feedback on safety issues at the work site.

The development of a process for measuring liability in the employer's management system is a part of the program administration element of the safety management system and is important as everyone should know their responsibilities for the workplace health and safety. Employers are the ones who have the vital responsibility and are also responsible for everything that happens in the worksite, supervisors have the administrative responsibility and are responsible for ensuring that the required training, the use of controls,…, are maintained and that the expected results are achieved, finally workers have the immediate responsibility to take the required training, to use the defined controls, follow the rules and participate in the program. The health and safety program should be driven by measurable goals and objectives. Events should be recorded and maintained in order to compare statistics over time.

A company can use two types of performance measures to determine the level of safety and health performance: leading indicators that measure the activities used by the organisation to reduce the probability of an incident and lagging indicators that allow knowing if the systems are working as expected, they may include records of inspections, meeting minutes and investigation reports. The maintenance of statistics allows identification of trends that are useful to verify if the system needs some changes. Another way to identify improvements is the comparison of the company's results with the results from similar companies in the same industry.

Regular audits by an internal or external auditor should be carried out as they are a way of identify if the company system is comparable with a recognised standard and identify the areas for improvement. Audits may be the basis of action plans that should be followed up by managers on a regular basis to assure that action items are being completed. A health and safety management system should be adapted to the continual improvement of work processes and activities.

How is a Health and Safety Management System evaluated:

Normally companies conduct regular reviews of their Health and Safety Management Systems through annual audits. These audits are conducted by certified auditors, they cover the basic elements of a HSMS and require the use of personnel interviews, documentation review and workplace observation as data gathering techniques.

OHSAS 18001

OHSAS 18001 Occupational Health and Safety Zone is an international occupational health and safety management system specification. It is divided in two parts (18001 and 18002) and includes BS8800 and some other publications.

OHSAS 18001 is intended to help organisations to control occupational health and safety risks and was developed in response to extensive demand for a recognised standard against which the companies can be certified and assessed. OHSAS 18001 was created by some of the world leading national standards bodies, certification bodies and specialists consultancies. The main purpose to write OHSAS was to try to remove confusion in the workplace from the increase of certifiable OH&S specifications.

OSHAS specification is applicable to a company that wants to minimize risk, improve an existing OH&S management system, demonstrate carefulness and gain assurance. The OH&S also helps to (The Occupational Health & Safety Group, 2007):

- Assure the company of its conformance with its stated OH&S policy and demonstrate such conformance to others.
- Implement, maintain and continually improve an OH&S management system.
- Make a self-determination and declaration of conformance with this OHSAS specification.
- Seek certification/registration of its OH&S management system by an external organisation.

OHSAS 18000 is a part of the Health and Safety Electronic Toolkit that includes OHSAS 18001/2 and some other material and information:

- OHSAS 18001/2 contains the full text of OHSAS and are the two standards that assist in the implementation of an occupational health and safety certification.
- The Guide ("Guidance for Implementation of OHSAS 18000") is a practical guide to the standards as it clearly explains how occupational health and safety management using OHSAS 18000 can be undertake and integrated in the company, and it includes graphical explanations, a checklist and descriptions.
- The Safety Manual is a complete and detailed manual that includes the policies, procedures and handling guides.
- Risk Assessment is an introduction to safety a risk assessment and enables direct editing.
- OHSAS 18002 Presentation includes a full presentation, in an editable format that introduces and explains the OHSAS 18002 standard.
- Awareness is an extensive and detailed general health and safety presentation that was designed to act as an awareness help to employees and subcontractors.
- Assessment Surveys includes a collection of safety assessment surveys that was created to help in the identification of shortcomings and potential problem areas.

"Guidelines on a Major Accident Prevention Policy and Safety Management System" was developed by the European Commission and provides explanation on the requirements of the "Seveso II" Directive (96/82/EC) and it concerns a "Major Accident Policy" and "Safety Management Systems". This directive is intended to prevent major accidents involving dangerous substances and the limitations of their consequences. The Directive sets out the basic principles and requirements for policies and management systems and that are suitable for the prevention, control and mitigation of major accident hazards. The guidelines were developed following a review of the implementation of the Council Directive 82/501/EEC (SEVESO I). The directive sets out two levels of requirements that correspond to "lower tier" and "upper tier" establishments. While lower tier establishments are just required to draw up a Major Accident Prevention Policy (MAPP), the operator from an "upper tier" establishment is required to demonstrate in the "safety report" that a MAPP and a Safety Management System for implement it have been put into practice in accordance with the Directive. The MAPP was designed to guarantee a high level of protection for man and the environment by appropriate means including appropriate management systems.

There is a progressive tendency to create integrated systems which include, among others, quality, environment and safety.

2.4. Performance Indicators

In any system, it is necessary to set and measure performance outcomes in order to determine whether the system is operating in accordance with expectations and to identify where actions may be required to enhance performance levels to meet these expectations.

Key Performance Indicators (KPI) offer businesses an instrument for measurement, as they are quantifiable measurements that reflect the performance of a business sector in the perspective of achieving its goals and objectives (Department for Environment, Food and Rural Affairs, United Kingdom, 2006). The KPI are a useful tool in helping to implement strategies by linking several levels of a company with clearly defined targets and benchmarks. Additionally KPIs are important because they focus on essential measures, the ones that are the most relevant to understand a business and help to decrease the need for long reports on a big variety of measures, and allow to report on important business areas.

There are some general principles that a company should follow and provide a guarantee to the business and to his stakeholders that appropriate measures have been followed (Department for Environment, Food and Rural Affairs, United Kingdom, 2006). The first principle is transparency, which is essential to produce a credible report. A description of how and why the data is collected adds value to the quantitative data. It is also important to consider the level of public disclosure, the definition of boundaries of the company to which the report applies and an explanation of the internal processes to manage and report risk.

The second principle is accountability, meaning that a company can be held responsible to a variety of different people for its behaviour. In this principle it is important to consider the definition, level and nature of stakeholder engagement, the existence and quality of a third party assurance statement, the integration of specific reports in the annual reports and accounts, the existence and success of a communication strategy and the extent to which information is specifically identified and adapted to the needs of the institutional investors.

The third principle is credibility. It is essential that any reporting is placed in context, to link the specific impacts and understanding of the company to the wider movement by society to embed the principles of sustainable development.

Additionally to the general reporting principles, there are some KPI specific principles (Department for Environment, Food and Rural Affairs, United Kingdom, 2006):

- Quantitative – KPIs should be measured in a quantitative way. Sources of relevant information and data should be available as soon as possible adding transparency to the report and allows independent analysts to undertake deep researches.

- Relevance – Additionally to the quantitative information, every KPI should have a general narrative with an explanation of its purposes and impacts. All relevant information and comparators should be taken into account and each KPI should describe the progress undergone, the calculation methods and any relevant assumptions. The progress of each KPI should be discussed, including discussion on targets, whether improvements or regressions have occurred and how the company is dealing with it.

- Comparability – As far as possible, companies should be able to report data in a comparable format, this way the users of the report can evaluate the performance of a single company over time and compare it with its competitors. KPIs should be expressed in absolute terms that cover the whole business for each period of reporting and they should be related to a normalising factor (the most commonly used factors are turnover and production output). Normalised data is helpful to demonstrate the company's improvements in the management systems. Reporting should be consistent with other types of company reporting as far as possible.

2.4.1 Quality Indicators

Quality indicators might refer to either the quality management system or to specific processes. Some of those are related to quality control.

Quality control includes the measurement of concrete characteristics and the use of that information to assess the quality of production or service provisions in order to present an indication of the changes that should be made to processes, materials and people working in the company. The two most used forms to ensure conformance to standards are Statistical Process Control (SPC) and Acceptance Sampling (AS).

Statistical techniques are a useful tool for the company to understand variability and consequently help in problem solving and in the improvement of effectiveness and efficiency. They also measure, describe, analyse, interpret and model variability[20]. Statistical analysis of data helps to provide a better understanding of the nature, extent and causes of variability, so it can helps in solving and preventing problems that result from the variability, and in the promotion of continual improvement.

Statistical Process Control (SPC)

It is accepted that common causes cannot be completely eliminated; SPC tries to eliminate all the special causes and as many as possible common causes. SPC is most often associated with sampling a process during the production of goods or delivery of services.

Variation is the result of two types of causes (Kelemen, 2003):

- Special causes occur from time to time and have unusual patterns of variation. It is possible to remove them with the appropriate knowledge. As examples it is possible to mention poor lighting, equipment malfunction and broken tools.
- Common causes lead to natural or random patterns of variation that are observed in the data when they are free of special causes; they are considered to be inherent to the process and cannot be completely eliminated. When just common causes are present the process is considered to be stable and consequently predictable. As examples of common causes can be mentioned poor supervision, inappropriate facilities layout and poor design.

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[20] Variability can be observed in the behaviour and outcome of activities and in measurable characteristics of products and processes. It exists in different stages of the product life cycle.

SPC is based on the use of statistical methods (for instance flow charts, check charts, histograms, cause effect diagrams, Pareto analysis[21]) to monitor and improve quality and productivity of manufacturing and service operations and it implies the implementation of control charts to detect any changes in a process that may affect the quality of the output. The statistical methods are used to verify if the measurement systems, machinery, production equipment suit the company and assess the capability of the process. In the transformation process, the operators of each process are the responsible for quality. The statistical methods are useful to asses if the process is capable of meeting preset requirements, if the process is meeting the requirements at any point in time and help identifying and adjusting the process or its outputs if the requirements are not being met (Kelemen, 2003).

Process control charting assumes the frequent sampling of a process and projecting the results on statistical control charts. All processes should be monitored as in time things may change and cause deterioration in the process quality.

"Control charts are pictures of what is happening in the process at a particular time and are based on taking samples from the process and observing the values of a particular quality characteristic, named χ." (Kelemen, 2003)

The distance between the control limit and the process mean quantifies the inherent variability of the process. When a process has high variability, its control limits will be large while a process with low variability has narrow control limits.

SPC can be used to control process variation by controlling special causes, to reduce the variation by continually improving the process and eliminating some of the common causes, to help assessing the performance of a process, to provide information to assist management with decision making.

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[21] Pareto analysis is a statistical technique in decision making that is used for selection of a limited number of tasks that produce significant overall effect. It uses the Pareto principle – the idea that a large majority of problems (80%) are produced by a few key causes (20%).

Sampling Acceptance (SA)

SPC is not the most appropriate method when entire batches of products or services need to be inspected before the production process is able to start. Sampling Acceptance (SA) is usually performed to assess samples of incoming or outgoing goods and services and is carried out on attributes using the proportion of wrongs to rights. The purpose of this method is to decide to accept or reject the whole batch based on a sample.

2.4.2 Safety Indicators

The acceptable level of safety expresses the safety goals or expectations of an oversight authority, an operator or a service provider and provides an objective in terms of the safety performance that the operators/service providers should achieve while conducting their core business functions. To determine the acceptable level of safety it is essential to consider some factors as the level of risk that is applied, the cost/benefits of improvements to the system and public expectations on the safety of the industry (International Civil Aviation Organisation, 2006).

The concept of acceptable level of safety is expressed by two measures/metrics that are implemented through the various safety requirements (International Civil Aviation Organisation, 2006):

- Safety performance indicators – measure of safety performance of a department. They should be easy to measure and be connected with the principal components of a company's SMS. Consequently the safety indicators will be different between departments of a company and between companies.
- Safety performance targets – can be quoted as goals or objectives and are determined by considering what safety performance levels are desirable and realistic for individual departments, operators, concessionaires or service providers. The targets should be measurable, acceptable to stakeholders, and consistent with SMS.

The term safety requirement is also important to the SMS. Safety requirements are needed to achieve the safety performance indicators and safety performance targets. Safety requirements should include the operational procedures, technology, systems and programmes to which measures of reliability, availability, performance and/or accuracy can be specified.

The three concepts presented before are interrelated meaning that the acceptable level of safety is the general concept. Safety performance indicators are the measures/metrics that are used to determine if the adequate level of safety has been achieved. Finally the safety performance targets are the tools or ways that are required to achieve the safety targets. Targets and indicators can be different, for example when the safety indicator is expressed in terms of number of accidents over a period of time and the safety target is expressed in terms of accomplishing an objective, or they can be the same, for example when the safety target is expressed as maximum of accidents that may occur during a period of time.

A variety of different safety performance indicators and targets provide better knowledge of the acceptable level of safety in the company or industry sector than the use of a unique indicator or target.

3. CRITICAL ANALYSIS AND CONCLUSION

Quality and Safety are important concepts for companies as customers are becoming more and more demanding. These concepts need a careful management and they must be managed by the whole company as everyone in the company is responsible to build a product and/or service that meets the customers' and stakeholders' requirements or needs.

For the companies to be able to meet quality and safety requirements, these concepts are managed in a system approach that contributes to the organisation's effectiveness and efficiency in achieving its objectives. These systems have some essential components (organisational structure, responsibilities, procedures, processes and resources) that are the basis for their correct implementation within a company. Quality and Safety Management Systems should be managed as a whole.

In a company, managers are responsible to establish the policy of the system, to set the goals and objectives, to set a standard of performance and receive information regularly, to demonstrate commitment to the system, communicate expectations, to ensure that all operations are complying with legislation, to provide adequate supervision and resources, to ensure that non-conformities are investigated and corrective actions are taken. They are also responsible to ensure that inspections are conducted and corrective actions are taken where necessary, to identify training needs and ensure proper training of workers, and to correct unsafe acts or condition.

Workers should be familiar with their job, participate in the systems and make suggestions to improve it, participate in the trainings provided by the employer, follow the standards, and comply with rules and legislation. Workers should also report unsafe situations to their superiors, and when and where possible correct unsafe situations as soon as possible. Workers should refuse to work in unsafe conditions, ensure that accidents, incidents and near misses are reported to their superiors and that the causes are investigated. They should use protective equipment when necessary, and be familiar with the emergency response plan and location of first aid, fire fighting and communication equipment.

The subcontractors should also implement and follow the management systems of the company that they are working for, ensure that all the workers are competent to do their job, be aware and meet the company's expectations, ensure that work complies with the agreement done and with legislation, and provide the resources to allow workers to complete their job safely.

It is also important to monitor the performance of the company. To do this, companies can use indicators based on statistical techniques that are useful to understand the variability of a process and consequently they can help in problem solving and in the improvement of effectiveness and efficiency.

The ECTA Responsible Care Program is an example of the integration between the two topics reviewed: quality and safety. The procedures from the programme can be compared to a management system. First of all, to become an ECTA member a transport company has to prove that its procedures, practices and management indicators are among the best in the industry.

After being an ECTA member, when a company applies to be a Responsible Care company all its sites must be third-party audited to ensure that all the sites under Responsible Care programme are conform to all requirements. All the aspects of Responsible Care programme are documented and all Responsible Care companies are ISO 9000 accredited.

The Responsible Care contract and the CEO commitment to ECTA's principles are signed by the CEO and that guarantees to ECTA that the RC programme is applied in the companies in a top-down way. The CEO, as the highest-ranking corporate executive in charge of total management of an organisation, is committing the entire company to apply the environment, health and safety principles that ECTA defends. This is a way for top management to show leadership and commitment to the programme.

RC companies are obliged to give to ECTA in an annual basis the Improvement Plan for the year and an evaluation of the Improvement Plan from the previous year. These documents are the commitment of RC companies for continual improvement and show

the efforts that he companies are making to achieve their objectives. As well as the companies ECTA also has to write an annual improvement plan.

The Responsible Care programme receives information from the companies (input) and uses it in a neutral way, where the individual companies can not be identified, to produce documents (outputs) with an overview of a particular issue. During my internship period, I created an Improvement Plan document relating to information of 2009. This document was useful to know in which areas the RC companies are focusing.

With the KPI Form ECTA aims at evaluating the Responsible Care companies as a whole. The purpose of collecting the KPIs from all Responsible Care is to have statistical information about accidents and incidents. The statistical information provided by the companies will be grouped and will give information about which indicators should be improved. The statistical information, in a neutral format, will be provided to the companies so they can also have an overview of what can be improved.

All Responsible Care companies, when entering the RC programme, are also obliged to provide to ECTA an emergency telephone number for every site that the company has. The list with all the telephone numbers is only available to ECTA members and works as an emergency response plan in a safety system.

Finally, I can say that this internship was useful to get a first working experience. I was working for five and a half months and during this period I did not have a tutor to follow my work during two months. In this period of two months I had to work for a great deal independently. This fact gave me the chance to improve my communication skills, both written and spoken, and to be in charge of transmitting all the knowledge that I acquired to a new trainee. Due to the fact that I did not have a tutor for two months, I was in charge of managing all the aspects of the Steering Team meeting where the KPI Form to distribute for all the Responsible Care companies was approved. My work contributed to keep the Responsible Care programme updated and I prepared some documents that are now essential parts for the maintenance and improvement of the programme.

As a point for future improvement I can mention that I can be more careful in proofreading the documents that I create and be able to better judge my work because some of the documents that I did needed to be revised by my tutor as they had some points that needed to be improved.

The subject Total Quality Management formed, in my opinion, the most useful background to this undertaking.

Concluding, I would like to say that this was a valuable experience which helped me to improve my professional attitude and gave me renewed insides management in general. I would like to continue working in an international environment focused on the European or global market.

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ATTACHMENT 1

ATTACHMENT 2