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HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT SYSTEM : A METHOD FOR RANKING IMPACTS IN SMALL AND MEDIUM ENTERPRISES

A. Accorsi¹, J.P. Pineau, A. Prats

1. INERIS, Verneuil-en-Halatte, France

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ABSTRACT

ELF ATOCHEM and INERIS have worked together on a management system concerning at the same time health, safety and environment. The basis of the management system is the ISO 14001 standard dealing with environmental management. The same concepts were extended to health and safety.

After elaboration of general documents, the application was carried out in 9 SMEs. The identification of significant Health, Safety and Environment aspects in normal, transient and accidental conditions is obtained through a ranking process dealing with probability of occurrence, gravity and control of the hazardous situations through detection or monitoring or procedures.

After a detailed description of this ranking method, the teachings of this field experiences will be presented : need of a steering committee, of complete implication of all partners, of written procedures, explanations about the use of existing procedures, importance to put in practice the prevention of incidents and need of reporting and analysing these incidents.

INTRODUCTION

ISO 14 000 series standards allowed the development of Environmental Management Systems by reference to the model "Plan, Do, Check, Act (PDCA)".

Quality standards are currently under revision by using the same PDCA scheme.

In Occupational Health and Safety, many reference documents internal (Du Pont, Shell ...) as well as external (BSI Standard 8800 and AS/NZS 4804000) are in existence. Until now, the international standardisation is progressing slowly owing to the fact of various regulatory approaches.

The PDCA scheme in ISO 14001 standard could be considered as a starting point for any Health, Safety and Environment Management System (HSEMS).

Elf Atochem, one of the French greatest chemical group, and INERIS, the National Institute for Industrial Environment and Risks, have worked together to devise an operational tool for HSEMS dedicated to small and medium enterprises. The field application was checked in nine facilities.

The goal of INERIS, acting in this case as a consultant, was to offer a tested methodology for any small and medium enterprises.

In this review paper, we will firstly describe the documents requested for such a task by reference to the various aspects to be dealt with. Then, we will insist on the need of a ranking system allowing the choice of significant health safety and environmental aspects.

At the very end of this document, difficulties to be overcome in such a work will be pointed out.

REFERENCE DOCUMENTS

Occupational Health, Safety and Environment : linked fields

The exact fields of Occupational Health, Safety and Environment are not so easy to be defined. However, there is a clear link : on a chemical plant, one accident (e.g. accidental release of toxic fluid) may lead to health problems (e.g. illness), safety troubles (risks of fire) and undermining of the environment (water pollution). But while fields are linked, limits are none the less easy to draw.

Interconnection between those three aspects are not really so clear. For example, industrial doctors consider occupational accidents as Safety issues, whereas people interested in major accidents mitigation believe that "minor" accidents remain in the field of occupational health and safety (see figure 1). Moreover, major accidents may have serious impacts on goods and people, but also on the environment (e.g. the Seveso plant accident, or the Tchernobyl case ; see figure 2). Finally, the field of environment grows larger and larger including health problems, especially public health (see the transgenic food case).

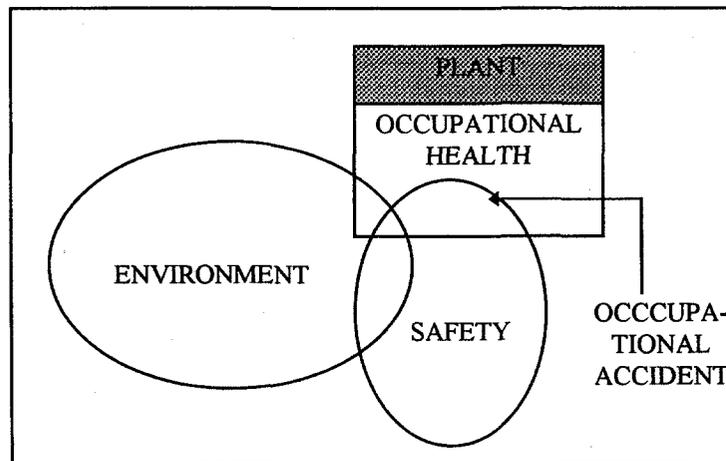


Figure 1. The limit between Occupational Health and Safety

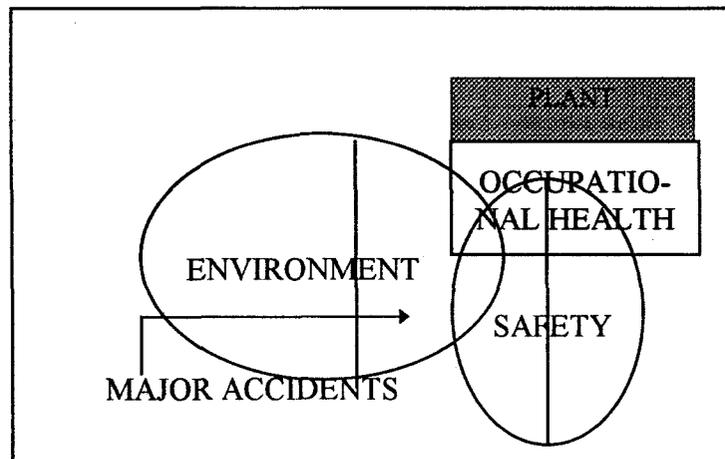


Figure 2. The limit between Safety and Environment

That is the reason why a Safety Management System is requested by the Directive 96/83/EC, December 19, 1996 issued from major hazards preoccupations.

Sequence of documents for a relevant management system

By reference to ISO 14001 standard and the requirements given in 96/82/CE Directive, a basic general document "The HSE referential" was written. It includes the following and successive steps :

- policy (objectives)
- planning (hazard identification, risk assessment taking account of the existing regulations, in order to define the HSE significative aspects)
- control and corrective action (accident investigation ...)
- management review.

Another general document is the application guide in which developments and explanations are given on each part of the HSE referential.

Specific documents more adapted to a given sector or a given process are then derived.

The first specific one is the operational guide in which detailed information is given on the aspects to be dealt with in the final document : the HSE Management System for the facility, used for the operation of the plant.

Implementation of the system

The HSE Referential and the application guide were written in a preliminary task by a general group consisting of ELF ATOCHEM and INERIS experts.

Nine plants all over France participated in the test operation. Seven visits per plant had to take place, made by the INERIS consultants in close connections with the manager and operators of the facility.

Specific tools have not been created for each chapter of the HSE referential. For the Policy for instance, only examples were given. For most chapters, only charts or logigrams were required. But some parts needed a more in-depth study, especially the analysis in which the ranking of HSE aspects is performed.

This ranking allows the management system to become relevant. Its goal is to establish a list of significant HSE aspects which will be ameliorated or cured afterwards.

While this approach was validated for chemical plants, between 20 and 300 people in size, it is nevertheless currently used in other industries (pharmaceutical laboratory ...).

A RANKING SYSTEM

Ranking the various Occupational, Health, Safety and Environment aspects is the only mean to be sure that an exhaustive HSE analysis is carried out and is the basis of the managerial decisions on the aspects considered as significant.

The significant aspects are those from which the risks are the highest for the Occupational Health, Safety and Environment and the controls are the worst.

The methodology includes five steps.

In a first step, the various parts of the plant are distributed in sectors when it is a very extended firm, or in basic activities in the other cases. Figure 3 gives examples of various activities involved :

- products delivery
- dispatching
- storage of goods
- store room
- secretariate
- electric work
- welding
- containers cleaning
- laboratory tests
- guarding
- cafeteria
- incineration

Figure 3. Examples of industrial activities

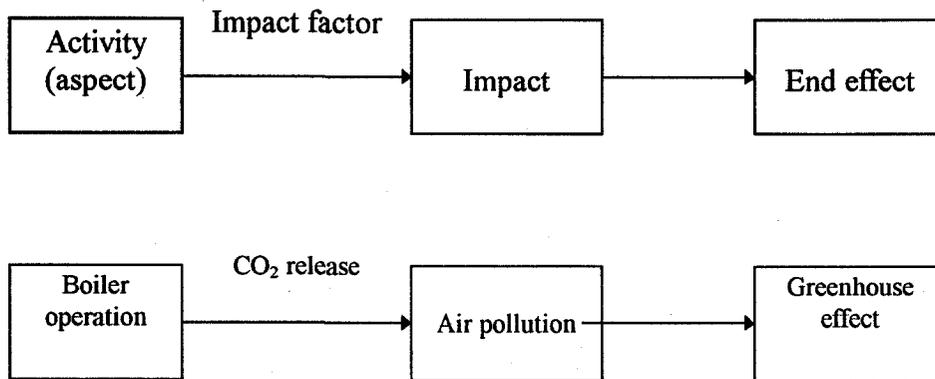
In a second step, the HSE impact factors are examined for each activity or sector. Some examples of these factors are given in Figure 4.

Occupational Health Impact factor	Noise Working conditions (temperature, lighting, work place layout, operation and laptop screens) Handling Odors Dust Chemical Radiations Vibrations
Safety impact factor	Pressure vessels Falling materials Vehicles moving Work in high premises Work in a confined space Hazardous machines and equipment Handling Hand tools use Overpressures Use of electricity, thermal fluids, compressed air Use of dangerous substances Use of radiations Vibrations
Environment impact facteur	Noise Energy and water consumptions Materials consumptions Wastes Integration in the landscape Soil and subsoil pollution Dust Vibrations Radiations Water releases Air releases Transportation

Figure 4. Examples of HSE impact factors

For each activity, one or more impact factors are to be considered in order to define the impact factors and the HSE aspects.

The link between these notions can be explained on the following example.



In a third step, for each aspect, a ranking between 1 and 4 is given on the basis of three criteria : occurrence, severity and control.

Figure 5 explains the various notes.

Occurrence	<ol style="list-style-type: none"> 1. none or annual frequency 2. monthly frequency 3. weekly frequency 4. daily frequency or more
Severity	<ol style="list-style-type: none"> 1. minor 2. notable 3. critical 4. major
Control (monitoring)	<ol style="list-style-type: none"> 1. detection possible ; controlled if detected by regularly checked instructions or monitoring equipment 2. detection possible ; controlled if detected by unregularly checked instruction or monitoring equipment 3. detectable ; uncontrolled if detected (unadapted equipment and instructions) 4. undetected

Figure 5. Notes for the ranking of HSE aspects

Multiplication of the three notes to get a global note allows a ranking **in the fourth step**. It should be pointed out that the conformity to existing regulations is to be taken into account in the ranking ; when the non-conformity exists, the aspect is always considered as significant.

Finally (**fifth step**), it is the personal responsibility of the managing staff to define the level at which an aspect is considered as significant.

When the ranking is obtained, the specific means for the improvement of the situation are to be established considering the economic aspects, the available technologies and the staff needed.

DIFFICULTIES, LESSONS LEARNT AND RULES FOR THE SUCCESS

Currently, teachings come from the experience within ELF ATOCHEM plants.

In existing plans, the operation of a HSE management system can be more or less difficult depending on previous experience and practice with quality system (ISO 9000 series) or environmental system (ISO 14000 series). This is related to the fact that written structured documents exist or not.

In this particular case, three levels of documentations were distinguished : general manuals, procedures and operating and instruction rules. The responsibility of the first two levels may be controlled by the management staff, the third level may be left to the operators.

For the control and corrective action of the system, a difficulty can occur from the lack of experience about the report of non conformities and how to treat them. As an alternative, the supervisor reports can be used. Investigations of accidents and incidents are also a way forward for non-conformity approach.

The analysis of functions to be carried out and the definition of jobs are important to be discussed with all implied staff.

It is also necessary to use this opportunity of putting into operation a HSE management system for the definition of the follow-up of regulations and the definition of an auditing on documentation system, operation and conformity to the regulations.

Some success factors

At a first step, all staff must be made aware and sensitive to the improvement of the situation. This is related to the need of a steering committee for all the work to be undertaken and the complete implication of all staff.

In general, a lot of existing written documents can be used as parts for the implementation of the HSE management system.

The approach of non conformity is rather difficult and may be based on investigations of accidents and incidents.

In fact, the approach is the one adopted for any industrial plan : a clear policy at the top management level, participation of all staff, objectives definition, check regularly, readjust objectives and means when necessary, make the personnel sensitive at every step.

CONCLUSION

A safety management system tested, checked and validated in a pilot operation in nine plants can be directly used by ELF ATOCHEM for all of its other small and medium facilities. The purpose of INERIS was mainly to use it for any small enterprise. For the future, the referential and the application guide can be used without changes, but the operational tools (operational guide) might be adapted to any specific industrial field.

Such a system implies a ranking of significant health, safety and environment aspects. This ranking considers three aspects : occurrence, severity, control (instruction and equipment). From this ranking, significant aspects may be extracted and become the basis of the definition of means for improving the situation.

Success in implementation of a HSE management system is related to all staff becoming sensitive to the positive improvement of the situation, the introduction of a written culture (general instructions, procedures ...), the need of enough time, the learning from accidents and incidents and the use of existing means.