



Environmental Science

An Indian Journal

Current Research Paper

ESAIJ, 12(2), 2016 [051-059]

Implementation of an environmental management according to ISO 14001 version 2004 case of a cheese company in industrial park AIN SBAA CASABLANCA- MOROCCO

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ABSTRACT

The purpose of this article is implanting practical steps to setting up of an environmental management system and provides a performance evaluation of environmental program.

A company leader in cheese product in Morocco has a positive outcome in terms of improved environmental performance. The company seeks to demonstrate its commitment to improving its environmental performance level; it has developed a project to implement an environmental management system.

The analysis of the results of our study showed that the process of a cheese product involve adverse environmental effects “important water consumption and energy and large volumes of wastewater with high organic load (2550 m³ / J)” and the company will only meet 26,66% of the requirements of ISO 14001, according to the environmental analysis we found significant environmental impacts which represents 28%. Corresponding to the production of waste, water pollution, air pollution and consumption of natural resources. © 2016 Trade Science Inc. - INDIA

KEYWORDS

Cheese product company;
Environment;
ISO 14001;
Impact;
Performance.

INTRODUCTION

Since the introduction of ISO14001, many companies have found a driver and a methodology for the implementation of the Environmental Management System^[1] thread.

The EMS is a system and database which integrates procedures and processes for training of personnel, monitoring, summarizing, and reporting of

specialized environmental performance information to internal and external stakeholders of a firm^[2].

The sustainable development of our economy and the continuous improvement of our companies will be possible only in the context of respect for the environment. All enterprises must be set up a systematic measure to ensure environmental compliance; the purpose is the improvement of environmental performance, defined as measurable outcomes En-

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Environmental Management System in relation to the control by the organization's environmental aspects on the basis of its environmental policy, objectives and environmental targets^[3].

Companies gathered in "Enterprises for Environment" know that the challenge of this evolution towards sustainable development can be met only if all companies suppliers and customers, whether this company is large and small, are also committed firmly in this direction^[4], that's the "Environment is fragile".

It is therefore essential to take action to remove even reduce the negative effects^[5] To do this, there are a number of environmental assessment tools among them, The Life Cycle Analysis (LCA) Analysis of the effects of their failure modes and their criticality on Environmental (FMEA-E) the Environmental Impact Assessment Study (EIA), environmental audits etc.

A Cheese product Company has experienced significant development and improvement. It seeks to demonstrate its commitment to improving its environmental performance degree mainly with its main prime contractor, namely the ecosystem and the application of the ISO 14001 standard requirements. To do so, the company has developed a project to implement an environmental management system, a subject that sparked my interest and subject of this article.

MATERIALS AND METHODS

Study area

The implementation of environmental aspects in most industrial enterprises is made by a reflection on the reduction of environmental impacts at the pro-

duction site by adopting the Environmental Management System aimed at continuous improvement of its environmental performance by integrating environmental concerns at all process of the company. The environmental evaluation has many tools. The most used is the Impact Study (EIA) (European Commission, 2007)^[6].

Method

a) Initial diagnosis: survey

This part aims to self improvement program of the environmental management level within the company. Self improvement program is conducted around 9 themes, for which it is appropriate to answer some questions. It is important in a first phase that the site leadership is actively involved in the environment programme, and directly encouraging a environment culture throughout the Site, and is clearly communicates the issues and objectives sought by the certification. The company's assembly should know the requirements of the ISO 14001 standard and define their conformity percentage. A Check List presents a model for analyzing the dysfunctions and failures within the company according to the requirements of ISO1400 Standard. We take the example of the environmental policy.

b) The environmental evaluation

The objectives are defined; the environmental analysis is done in three distinct steps which are the subject of a participatory approach at all levels of the organization to involve staff in the analysis. The different steps of Environmental analysis are:

Division and mapping of the site area

We conducted a division into sector and activity to be placed at a sufficient level of detail to analyze

TABLE 1: Model of the check list

Environmental Question	Answers
- Is there an environmental program (policy, process, procedures, and mission) of the leadership, and a clear strategy for consumption of natural resources. (water, energy...)?	
- Political includes a commitment :	Non
- Continuous development,	
- Prevention of pollution and wastewater	
Comment	Necessity of deviation policy

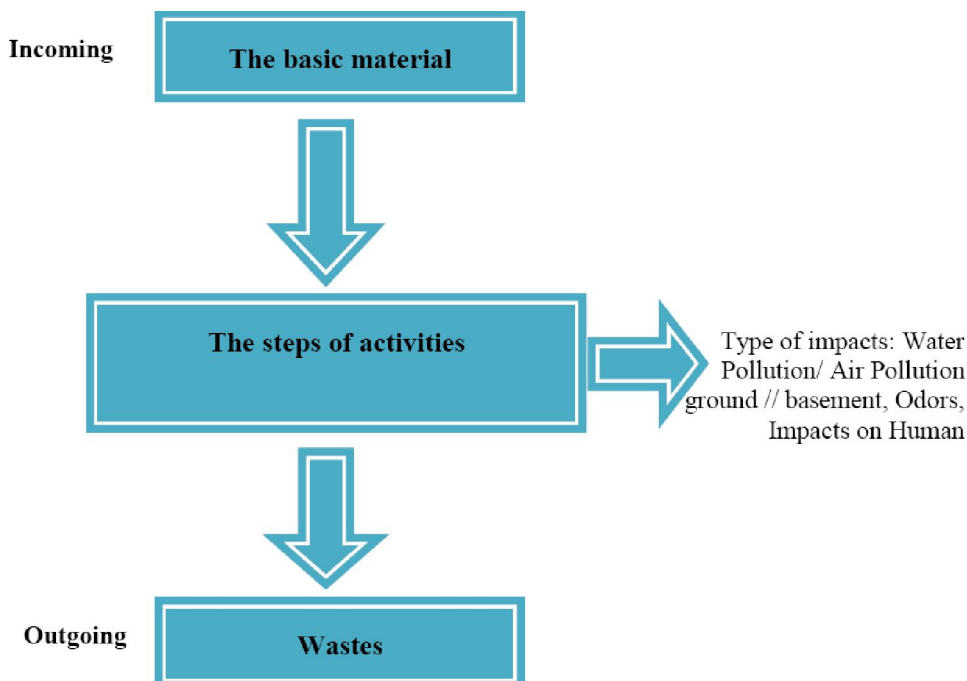


Figure 1 : Division and site mapping

the environmental aspects and impacts. This division will cover all business activities (workshops areas, construction sites, infrastructure, warehouse...)

Identify the environmental aspects and impacts

The objective of the environmental analysis is to step up and improve and to identify and prioritize the negative environmental impacts “significant” and “manageable”. In view of these considerations, it is indeed very important to conduct a comprehensive identification of aspects related to the activities and products of each area in normal operation / accidental. Through the different manufacturing process to know especially dusting, boiler, pasteurizers and cleaning up the plant consumes a considerable amount of water that are supplied from city water (distributed by Lydec) and well water treated by reverse osmosis. TABLE 3 gives the facts concerning the drinking water at the site level. Wastewater Management: Water consumption in cleaning generates inevitably a considerably important amount of wastewater with degraded quality that requires treatment before discharge to the receiving environment. TABLE 2 presents the volume of wastewater discharged

Solid waste management

Waste management is a set of activities that include the following^[7].

- Collection, transport, treatment and disposal of waste;
- Control, monitoring and regulation of the production, collection, transport, treatment and disposal of waste; and
- Prevention of waste production through in-process modification, reuse and recycling.

Table below shows the quantities of each type of waste that is produced and its treatment.

The lack of statistical data regarding solid waste is due to lack of mastery of the amounts generated by the factory (no calculation of the quantity of each type separately but just a heterogeneous collection without indication of the quantity produced of waste).

Atmospheric emissions

The extraction, stabilisation and export of hydrocarbons involve several processes that give rise to atmospheric emissions.

The plant includes a steam generating unit this is the boiler room where there are three boilers which emit sulfur dioxide SO₂ from the combustion of fuel. Also, the exhaust semitrailers and aerosols escaping to the atmosphere. TABLE 6 shows only the main sources of atmospheric emissions.

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TABLE 2 : Wastewater management generated by the plant

Question	Volume of wastewater discharged daily	Comment	Existence of a separate system of rainwater drainage / sewage and sanitation process			Existence of a separate system of rainwater drainage / sewage and sanitation process
			Yes	No	Partially	
Answers	2550 m3/j	Loss ratio global water 6,89m3 / T. From 24/04/12: Leaking water at Osmosis A has generated a loss of 7m3 / 15min therefore 600m3 / d. No metering in the washing.	Yes	No x	Partially	Unitary network collecting wastewater from process of sanitation and storm water to be discharged directly into the sea without treatment (no STEP onsite or nearby).
			Public network WWTP	without	x	
			Natural environment			
			Combination			

TABLE 3 : Quantities of various types of solid waste and the treatment given to

	Type of waste	used oil	Chemical waste	Contaminated empty drums	worn ink
Quantity of hazardous waste generated last year	Quantity (ton) Type of traetement			- Landfilling	
Quantity of nonhazardous waste generated last year	Type of waste Quantity (ton)	Paper 30,9 t	Plastic 71,5 t	Wood 24,3 t	household waste -
Type of traetement		Other Treatment	Recycling outsourcing	Landfilling	

Hierarchy of environmental impacts

An evaluation is made of the aspects, hierarchical and estimated significant for the company, that is to say, those deemed as priority depending on the tool used. Therefore, the assessment of the environmental steps chosen by the company tool is to list the aspects in relation to the evaluation criteria namely the frequency, severity, and control.

The calculation of the global rating appearance is achieved by multiplying the scores for each criterion. (See the evaluation matrix) Each of the criteria is assigned a score between 1 and 4. A high score for a criterion results in:

- An occurrence / high frequency (high repetition...)
- A High severity (high volume or high hazard)
- An inefficient mastering (The means in place to master the impact).

The Evaluation Criteria:^[8]

Rating criticality

Occurrence / frequency

The occurrence characterizes the frequency of appearance. The increase in revisit frequency intro-

duces a range of applications that are based on regular collection of data and creation of composite images that highlight changes over time. The frequency introduces the concept of time “exposure” of man or the environment. In normal operation, it is the frequency of exposure to the dangerous situation or the environmental aspect.

Gravity

with a large gravity force, Environmental gravity takes into account both the intrinsic danger of the appearance and quantity / volume of the aspect (the higher the quantity or the volume consumed or rejected, the more gravity will be high). It may also take into account the sensitivity of the environment is impacted, this criterion can be processed separately.

Mastery

- Finally, control is defined by the features:
- The prevention: to limit the probability of impact or damage,
- The protection /intervention: to limit the severity of impact or damage.

It can be:

TABLE 4 : Sources of air pollutants emitted by the plant

	description	Emission source 1	Emission source 2	Emission source 3
List of main emission sources	Type of emission	Ch EGFI 12 t	Ch BANCOK 4 t	CEGFI 6 t
features		Heavy fuel oil No. 2 50 t	Heavy fuel oil No. 2 50 t	Heavy fuel oil No. 2 50 t

TABLE 5 : Evaluation Matrix

	Symbol	F	S	CB	M
	Wording	Frequency	Severity	Brute Criticity	Mastery
Scale for assessing environmental aspects and impacts manageable	1	Never during the life of the plant	Never or a few times during the life of the plant	Minimal consequences and may be deleted.	The impact is perfectly controlled through (x) means (s) in place
	2	Happened 1 time during the life of the plant	Several times a season (high output)	Consequences can be significant over time.	The means put in place to control the impact is moderately satisfactory.
	3	Happened more than one time during the life of the plant	Several times a month	Important and immediate consequences, but manageable after that time	= F x S x M The means put in place to control the impact are ineffective or non-existent
	4	The impact is perfectly controlled through (x) means (s) in place	The means put in place to control the impact is moderately satisfactory.	Serious, costly and difficult to master.	The means put in place to control the impact are ineffective or non-existent

- The technical provisions: technical provisions must be calculated on a prudent basis, using appropriate morality, mobility and disability^[9], for our study it concerns pollution control equipment, monitoring and detection, collective protective equipment and/or individual response equipment in case of emergency...
- The organizational arrangements: operations to ensure the availability and proper use of all equipment, practices to limit the risks and impacts through operating modes and instructions, skills management, quality observation system, training matrix, management of standards, validation of equipments and software system, process control, management of maintenance

It is a threshold that the organism is fixed arbitrarily and may not be affected. In our case the assessment was done at the activity retaining the trip-lets (activity / look / impact), significant aspects are

identified along with the impacts. After the identification of all issues and environmental, it is necessary to conduct an assessment and prioritization of the severity of the impact from the level of mastery of every aspect.

RESULTS

The results of diagnostic of the “Check List”

Percentage

Compliance: According Check List we have 60 requirements according to ISO 14001:

- 44 Non-Conforming, issues, anomalies, non conformity. (deviations)
- 16 Compliant.

We have found the following compliance percentage:

- $44/60 * 100 = 73,33\%$ (NC)

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- $16/60 * 100 = 26,66\%$ (C) (NC: Not compliant, C: Complies)

Therefore the company meets 26,66% with the requirements of ISO 14001, the results show that there are deviations, to be 100% compliant with the requirements, the LC must implement compensatory measures to minimize the differences.

Results of environmental analysis

Division of the site and the flow chart

We conducted a division into sectors allowing getting a sufficient degree of detail to analyze aspects / environmental impacts.

Units in which the environmental analysis is performed are the following:

- Units production process,
- Unit housekeeping and pest control: The role of housekeeping is to keep a clean, comfortable and safe house, the pest control is to ensure all potential sources of contamination are identified and controlled. For the maintenance is accomplished on a component, accessory, assembly, subassembly, plugin unit, or other portion either on the system or after it is removed by a trained maintainer. So the finished product is handled only with clean, sanitized hands, gloves, or utensils.
- Units auxiliary operations: Atelier Reverse osmosis, boiler, cold production workshop, and compressed air production workshop,
- Quality control laboratory,
- Cold room
- Shipping

Analyze results of the environmental aspects and impacts

Listing (evaluation scale)

The calculation of the global rating appearance is achieved by multiplying the scores for each criterion according to TABLE 5: When listing the environmental aspect is greater than the significance level, the appearance is said to be significant. If for one aspect, the site is not in compliance and some of its rating; it will be declared significant for the environment. To assess this, we applied the scoring table.

Quotation example

** Gravity For each attitude, and depending on the impact occurring, it applies the following quotations: Water pollution

The phenomenon of water pollution has been referred to in many texts-legal writing and rules not excluded- without an attempt being made to properly define the phenomenon^[10].

Water pollution by hydrocarbons (oil, gas oil, heavy fuel oil) or an organic chemical (glycol), taking a high time for biodegradability; was rated by the number 3; Hydrocarbon products, especially oils, exert detrimental effects on the hyponeuston (organismic community near the water surface),

Water Pollution by an inorganic chemical (nitric acid, sodium hydroxide...) having means for time biodegradability takes listing 2; Inorganic substances constitute by far the greatest proportion of chemical contaminants in drinking water. They are present in greatest quantity as a consequence of natural processes but several important contaminants are present as a result of man's activities.

Pollution of water by a dairy (milk, cream, milk powder) having biodegradability occasionally takes 1 listing.

After assessing the environmental aspects, it prioritizes to determine Significant Environmental Aspects. The Environmental Aspect is defined as an element of an organization's activities, products or services that can interact with the environment. The scores obtained are used to rank the issues and prioritize actions. Regarding AES, they must have a score above 12. This threshold may be revised management review. An environmental aspect can:

- Being controlled or monitoring
- Make the subject of an environmental action plan
- Undergo corrective action

The criticality of each impact is assessed through the rating scale (TABLE 5). It corresponds to the product of the parameters "Frequency", "Gravity" and "Mastery". The impacts beyond the criticality threshold (12) are called Significant Environmental Impact (IES). The table on the following page shows the evaluation results and prioritizing environmental aspects and impacts of one unit (The manufactur-

TABLE 6 : Assessment and prioritization of environmental aspects and impacts

	Units / workshops		The manufacturing process								
	Activity	reception / store			pasteurization homogenization				Cleaning / Disinfection		
Scale for assessing environmental aspects and impacts manageable	Aspects	Energy consumption (electricity)	Water consumption	solid waste	Water consumption	Discharge of cleaning products	Waste boxes Ferment	steam	Water consumption	Wastewater discharges	Solid Waste
	Impacts	Depletion of natural resources	Depletion of natural resources	Pollution of soil	Depletion of natural resources	Pollution of water and soil	Pollution of soil	Air pollution	Depletion of natural resources	Pollution of water and soil	Pollution of soil
	G		1	2	4	1		1		2	
	F								3	2	3
	M			1		2	3	1	1	3	2
C	2		1	2	16	4	6	2	6	16	18
Significativity		not significant			Significant		not significant			Significant	

ing process) of the company, The other units on which the environmental analysis is performed are: Units manufacturing process, Unit cleaning and disinfection, Units auxiliary operations: Atelier Reverse osmosis, boiler, cold production workshop and workshop production of compressed air, quality control laboratory, Cold Room, Shipping.

Distribution of significant environmental impacts (AES)

We found 73 environmental aspects identified in the site, the significant environmental impacts represents 28%; it corresponds to the first generation of waste, followed by water pollution, and air pollution, resource consumption and finally the noise emissions. This prioritization of significant environmental impacts resulted largely to define action plans. In general, the process of a dairy industry involves water consumption and significant energy and large volumes of waste water with high organic load (TABLE 2, 3, 4). For this reason, we have proposed a variety of Clean Production Opportunities in order to reduce consumption and final discharge without production is so far affected.

DISCUSSION

Through the results of the overall environmental

risk evaluation (6 sector, 14 activities, 73 areas) we can confirm that the level of risk management by the plant is inappropriate given the significant impact it has obtained. Thus, it is very important to put in place a global action plan defining the minors, majors and critical observations and appropriate preventive and corrective actions for each unmanaged risk or mismanaged whether in the field of accidents, reputation or administration. In a certification process, the main focus is on managing the environmental aspects and the control of environmental impacts. Step we have treated in this work, proposed improvement actions for significant aspects, generally, a dairy industry processes involve water consumption and important energy and large volumes of wastewater with high organic load. For this purpose, we have proposed a variety of Clean Production Opportunities in order to minimize consumption and final discharge without production is so far affected. The Clean Production Opportunities were classified according to the following points:

- Minimization at source, or any modification of processes, facilities, composition of the product or substitution of raw materials with the reduction of the generation of waste streams (quantity and / or potential danger), both during the process production and subsequent stages of their production.

Distribution of Significant Environmental Impacts (AES)

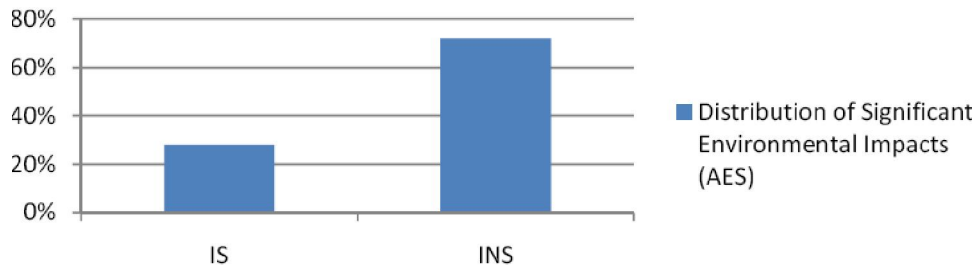


Figure 2 : Répartition des impacts environnementaux significatifs (AES)

- Recycle or the recovery option involving the re-introduction of a waste stream in the process itself or in another process. If performed in the production center where it was generated, it is considered recycling at source.
 - Valuation or the processes that allow the recovery of resources contained in waste.
 - Companies should establish, implement and maintain procedures to regularly monitor and measure the key characteristics of its operations that can have an IES.
 - These procedures shall include the documentation of information to monitor the performance of the applicable operational controls and compliance with environmental objectives and targets companies^[11].
 - Procedure to identify permanently the environmental aspects of their activities, products and services within the area defined for the Environmental Management System,
 - Procedure to identify areas that have significant impacts on the environment (Significant Environmental Aspects "AES").
 - Companies shall document this information and keep it up to date^[12].
 - Develop an assessment of the competence of personnel on the basis of predetermined skills matrix system defines the standard by which the company must comply^[13].
 - Identify and correct non-conformities and taking actions to address their environmental impacts, recording the results of corrective actions and preventive actions implemented.
 - Reviewing the effectiveness of corrective actions and preventive actions implemented^[14].
 - Perform conduct reviews of Environmental Management System at least once a year^[15].
- The ISO 14001 standard prescribes how a company can improve an environmental policy, identify environmental aspects and impacts of their activities, products and services, define the significance of these impacts; rank them, identify legal and other requirements governing the organization's operation, establish objectives and targets, implement programs to meet those standards, establish an auditing system and procedures for management review, and implement corrective action, if needed, based on audit findings^[16].

CONCLUSION

The Environmental Management System is a tool for compliance with the regulations on environmental protection, improved relations with regulatory authorities, prevention and control of pollution and improved Image Company. Official recognition of the Environmental Management System Company through its certification^[17].

In this context, the setting up of a management system according to ISO 14001 standards for a cheese company, all of my work has focused on the improvement of environmental analysis, and define objectives relation to this theme. The realization of such analysis is an indispensable basis for the development of an environmental program which must, first, be on the various environmental aspects of its activities. Then the company will have to determine which ones are significant. This is how it can re-

duce its impact and contribute to environmental protection.

Analyzing the negative results of the plant, it is clear that the latter has many significant health risks threatening and even degrading the quality of almost all environmental compartments (water, air, soil, water table...). Thus, the factory obliged to apply the proposed action plan after a detailed financial study to determine the possible actions that the plant must be undertaken in the short term.

Thus, every business needs to know the requirements of the regulations, industry codes, standards and permits that must be respected. Organizational systems are needed to ensure compliance and appropriate monitoring and possibly prepare reports^[18].

Finally, by integrating economic development with environmental protection and social progress. Factor for innovation and progress, companies have a significant role to play in encouraging of this development of. They will meet with constraints, difficulties but also market opportunities.

REFERENCES

- [1] P.Baracchini; Guide to the implementation of environmental management in companies according to ISO 14001 3rd Edition. Polytechnic and University Romandes Press, (2007).
- [2] Sroufe, Robert; "Effects of environmental management systems on environmental management practices and operations", Production and Operations Management. **12-3**, 416-43 (2003).
- [3] S.André; Evaluation synthesis ex post environmental performance of industrial sites, Sites where the entity refining company Total, Workbook Lamsade, **241**, July, 4 (2006).
- [4] K.Z. Président de Sustainable Business Associates Guide d'auto diagnostic environnemental Outil de gestion pour les entreprises, (2002).
- [5] L.Boubaker; Contribution à l'intégration d'une politique environnementale dans les activités des entreprises algériennes en vue d'une amélioration de leurs performances environnementale, (2012).
- [6] D.Hervieu, G.Napias et M.Tanguy; Le management Environnemental, Dossiers d'experts, Éditions de la lettre du cadre territorial, (1998).
- [7] Glossary of environment statistics: F.Series, No. 67 / Department for economic and social information and policy analysis, United Nations, New York, UN, (1997).
- [8] Ineris – DVM/MHSE/HPa/75119/06-0340) fiche conseil n2 ; 9.
- [9] OECD, Policy issues in insurance insurance in the baltic countries, apr 22th, 432 (2004).
- [10] J.G.Lammers; Pollution of international water-courses: A search for substantive rules and, BRILL, 724 (1984).
- [11] I.Callens; The determinants of corporate environmental response: Theories of the firm to empirical validation, PhD in Management Sciences, Catholic University of Louvain.
- [12] T.Whitehouse, M.Rider, J.Speir, D.Thompson; Good practices systems management environment for small and medium business, (2005).
- [13] O.Boiral; The environmental management system as ameans of controlling the variation and the emergence of environmental strategies, University of Poitiers, PhD in Management Sciences, sustained in November, 13 (2009).
- [14] C.Gendron; Environmental management and ISO 14001 the presses university of montreal, Montreal, (2004).
- [15] ISO/ IEC1702, Requirements for bodies providing audit and certification of management systems, (2006).
- [16] M.Jabrane, W.Fadili, B.Kennou, A.Labaali, K.Zahlane, I.Laouad; E'valuation de l'impact d'un centre d'hémodialyse sur l'environnement et l'écologie locale.
- [17] A.Prats; Establishment of an environmental management system, Edition:Technical Engineer, 000v2 G 5, (2008).
- [18] T.Audiffren, F.Guarnieri, J.M.Rallo, D.Lagarde; Compliance and certification survey mines- paristech quantitative, AFNOR, PREVENTEO, June, 54 (2012).