

**The Role of Human factors engineering in Enhancing Corporate Social Responsibility
Towards Employees: The Case of the Cement Company of Ain El Kebira**

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Abstract:

Human- factors engineering (HFE) can be seen as one of the main study areas in management that deals with improving human resources conditions. Besides making employees aware of their rights and the advantages they can benefit from, HFE ensures safety and protection from any risks and injuries for all the workers and provides them with safe working conditions adapted to their skills to the benefice of both the company and the employees. But in the mean time, satisfying the needs of employees and providing them with higher level of life-satisfaction are primary objectives of the social dimension of what is known nowadays as corporate social responsibility (CSR). Consequently, by implementing HFE techniques, companies may find the key solution to achieving the social objectives of CSR towards their employees and thereby enhance their motivation, commitment and productivity All of this are important and will have a positive impact on the company's reputation and competitiveness.

Hence, while recognizing the importance of all the above aspects, this paper has as a main objective to focus on the relation that may link HFE as a process to CSR and its ensuing results.

All this is done through a case study of one the most important companies producing cement in Algeria: Ain El Kébira cement company (SCAEK).

Key words: human-factors engineering, ergonomy, corporate social responsibility, employees, occupational safety.

ملخص:

حظي مبدأ حماية العامل باهتمام كبير، إذ تكفلت النقابات وبعض المنظمات غير الحكومية بحماية والدفاع عن العامل كرد فعل على معاناة الأفراد والعاملين في المؤسسات الصناعية. وعليه وجدت هذه المؤسسات في تطبيق الهندسة البشرية المنفذ لتعزيز مسؤوليتها الاجتماعية تجاه عمالها، وتحسن بذلك صورتها في ظل بيئة تنافسية مبدأها البقاء للأصلح. والهندسة البشرية من الموضوعات التي ظهرت واستجدت في إدارة الأعمال والتي تحتم بالموارد البشرية، ضمن مجموعة من الأساليب العلمية تسعى للاهتمام بحقوق العامل، ذلك أن الفرد العامل ومهما كان موقع عمله يفترض أن توفر له ظروف عمل من شأنها أن تحقق منافع للفرد والمؤسسة في آن واحد. من بين ما يصبو إليه الالتزام بالمسؤولية الاجتماعية في المؤسسات الصناعية هي حماية العاملين من مخاطر وإصابات العمل من جهة والتمتع بحقوقهم من جهة أخرى.

وأمام هذه الاعتبارات تأتي أهمية البحث في طبيعة بيان علاقة الهندسة البشرية بالمسؤولية الاجتماعية للمؤسسات بصفة عامة واتجاه العامل بصفة خاصة من خلال مراعاة حقوق العاملين، السلامة المهنية (الأمن الصناعي)، تصميم موقع العمل، والآلات والمعدات... وذلك بإسقاط الدراسة على مؤسسة الاسمنت بعين الكبيرة.

الكلمات المفتاحية: الهندسة البشرية، المسؤولية الاجتماعية، العامل، السلامة المهنية، المؤسسة.

Introduction :

It is logic that a company cannot reach its highest performance unless all its members get committed to its goals, and execute their tasks as effectively as possible. Previously, the companies used to guarantee their employees genuine job security in exchange for their loyalty. Nowadays, a lot of companies, and in a response to the pressure of competitiveness that is imposed by the situations of downsizing, reengineering and other fundamental changes, which have created a less secure organizational climate, the preservation of employees loyalty in the current business environment has become one of the main challenges that companies face under the daily uncertainty and lower job security.

Today employees are looking forward to improving their living and working in a safe working environment, as well as obtaining training courses. All this under an equilibrium between work and commitments. This is why many companies are trying very hard to stand in front of these new challenges in order to preserve and strengthen their stability of investing in human resources in efficient and effective ways and on a continuous basis. The same companies have found in the application of human factors engineering (HFE) a suitable solution for enhancing their social responsibility towards employees in order to improve their reputation in an environment that only leaves place for the righteous. HFE is one of the new emerging subjects in business management; it deals with human resources and uses scientific methods in order to answer employees' needs and rights. No matter the position of any employee, the company must provide adequate working conditions that are beneficial for both the employees and the company itself. On the other hand, it is well known that the well being of the employees enrolled by the is considered as one of the major dimensions that compose what is known nowadays as the enterprise corporate social responsibility (CSR). All this leads us directly to the main question of the present research which can be stated as follows: **What is the role of HFE in enhancing CSR towards employees at Ain SCAEK Company?**

Research Objectives: The study aims to achieve the following objectives:

- Definition of the concepts of HFE and CSR,
- The study of the relationship between human engineering and CSR,
- highlighting the role of HFE in the promotion of CSR towards the employees through a study case in the cement industry.

Section 1: The Theoretical Framework

I Human factors engineering

1 The definition of human factors engineering

Many academicians and researchers have long been interested in the concept of human factors engineering. It is worth noting that HFE is the counterpart to the concept of Ergonomics used in Europe whereas the former is much used by English-speaking is a composed word from *Ergon*¹ which means work and *Nomos* which means laws Alphonse Chappanis (1991)² defined HFE: "*Human factors engineering is the application of human factors information to the design of tools, machines, systems, tasks, jobs, and environments for safe, comfortable, and effective human use.*" It is also defined as the application of human factors in order to design and build social and technical networks that aim to guarantee the good design of the systems is a way that improves the human participation in production and diminishes the risks that are caused by the design, especially

concerning the health and the personal safety of the worker HFE is also known as: ³ *"The scientific study of the engineering relationship between the human being and the working environment. The working environment represents the conditions in which an individual works and what he uses as equipment and materials in the work site. The engineering relation means the compatibility and the harmony between the measurement of the human body, his muscle and sense abilities and what he uses as equipment and materials. It mainly aims to adapt the working environment to the measures of the human body.*

Thus, HFE can be considered as a scientific domain that tries to understand the interactions between humans and the remaining design elements (i.e machinery, equipments, tools, work conditions...) . It is the discipline that applies the theories, the principles, the data and the designing style in order to improve the performance. HFE helps in designing and evaluating the missions, the functions, the products, the environment and the systems in order to make it compatible with the needs, the capacities and the obstacles to a higher human performance.

We can conclude that HFE is the study that tries to improve the productivity and the health of employees by making their working environment, activity and equipments more compatible with the working individuals, whether from the level of lighting, ventilation, temperature or the furniture aspects.

2 The goals of HFE:

The programs of HFE aim to improve the health of employees and to preserve safety and effectiveness in designing machines, equipment, courses and offices in order to ensure the following:⁴

- Improving the performance of the working individual by increasing the speed of performance, the precision and the safety;
- Lowering the consumption of human energy and human stress;
- Lowering the cost of training;
- Reducing the number of accidents at work that are caused by human errors;
- Improving workers' satisfaction indicators.

3 The benefits of human engineering

HFE aims to solve the problems of workers at industrial companies. It also aims to provide them with security while doing their job. This is synonym to providing them with healthy and adequate working conditions that match the nature of the job itself, in addition to providing workers with all the necessary working accessories. Human engineering has many benefits, the most important ones are the following:⁵

- The human aspect: HFE aims to provide workers with maximum amount of mental and physical comfort. This is mainly achieved through adapting the surrounding environment to the measurement of workers' bodies and their capacities through the study and the analysis of human body positions that minimize fatigue and boredom;
- The study of the adequate working conditions: it includes the optimization of lighting, ventilation, temperature, humidity, noise, industrial safety and the potential working accidents.
- The improvement of working methods: it means the adaptation of working methods with the features of each job description through the analysis of the job and its initial components in order to exclude unnecessary moves. In addition to the measure of the

amount of time that every movement needs, in order to gain more speed and ease without wasting time and with less effort.

- The reduction of costs and the improvement of productivity: the attention to the human side and to the economy in movements and time directly lead to reducing costs and improving productivity. This has a positive impact on the company that tries to apply the rules of human engineering in a well studied way;
- The design of machines, equipment and tools: this will mainly facilitate and reduce the time of access with less effort and cost. This will also facilitate the use of machines, equipment and tools in a way that improves productivity and without any additional fatigue.

II Corporate social responsibility:

CSR is a modern concept. It has gained importance with the rise of lobbyists such as consumer protection associations and other NGO's. It aims to make companies play their societal role. At the beginning, companies, in their commitment to achieve CSR requirements, have focused more on consumers' satisfaction and environment protection, whereas the individuals who works on machines and equipments have received less attention. But with the development of HFE as a discipline and the vulgarization of its business benefits, companies started to give more importance to improve employees' working conditions in all their aspects.

1 The definition of CSR:

It is worth noting that Bowen was the first to use the terms socially responsible in a book edited in 1953 (FIFKA (2009)). Due to its complexity, the definition of CSR has seen, during the last sixty years, a big evolution. That is why, we have decided to focus only on the significant efforts that have been made by researchers in the last years. This may help in refining of this concept.

Elhauge⁶ has defined CSR as financial sacrifices that have benefits on the company.

According to FIFKA (2009)⁷, CSR is the legal and the economic commitment and the voluntary responsibility to participate in the development of the society that surrounds it. All this in the limit of the existing resources and the primary business strategies.

Benabou and Tirole⁸ have added to the legal side of CSR the principle of voluntarism. Social responsibility must include a large set of behaviors that will affect employees, such as social ethics, environment friendly, and the respect of the society.

Hopkins (2011)⁹ defines it as "*The encouragement of companies to make their profits from a responsible behavior*".

The European commission¹⁰ defines CSR as "*A concept through which companies can integrate social, environmental and economic commitments in their operation and interaction with stakeholders on a voluntary basis*".

This means that companies need to exceed the loyalty towards their legal commitments and invest in the human capital, the environment and the relationship with stakeholders.

The international organization for standardization¹¹ defines it as "*The responsibility of the company towards the impact of its decisions and activities on the society and the environment. This is mainly achieved through transparency, the ethical behavior that is*

coordinated with sustainable development, the welfare of the society and investors' interest" .

As a conclusion we can say that CSR does not exclude the commitment of the company towards its employees, who are considered as key elements in the activity of companies.

2 The principles of CSR:

In the following, we will go through the principles of CSR, as far as employees are concerned, that are introduced by (ISO/SR, 2007):¹²

- **The principle of legal compliance:** It means the respect of laws and the instructions, and diffusing them in a clear way inside the company.
- **The principle of respecting international and bilateral agreements:** Companies have to avoid any activities that can contradict these agreements.
- **The principle of respecting stakeholders and their interests:** The company has to be aware of the importance of stakeholders. In fact, it has to take care of their requirements, especially those that are related to the activities of the company itself. This usually requires a precise diagnosis of stakeholders and the establishment of adequate tools to share and consult them. In addition to giving them the opportunity to express their opinion, because their rights are protected by laws and contracts.
- **The principle of accountability:** Companies must comply to accountability from legal authorities and stakeholder. This accountability is related to the company's policies, decisions and procedures and the impact it can have on social development and sustainable development.
- **The principle of transparency:** It concerns all what is related to its interior structures, policies, systems, responsibilities, operations and the remaining information that are related to social development.
- **The principle of respecting the basic moral merits:** Companies are obliged to execute the policies and the practices that are related to the respect of rights and that have been set in place by international laws such human rights, in addition to local rules of the same kind.
- **The principle of respecting diversity:** Companies must believe that diversity among employees as well as their nationalities may bring new advantages, skills and experiences. Concerning the most important issues, concerning employees, that are related to its application, the (ISO/SR, 2007) has pointed out five issues:
- **Employment and work relationships:** The importance of employment lies in its participation in serving the society and improving the standard of living of individuals. This is usually done in a specific legal frame. Even if there are many differences in the legal systems, the employment relationship remains an international concept that everybody agrees on. It mainly links the company to the employee. This relationship is commercial but it varies from a country to another depending on the local laws. Generally, companies must respect the following set of observations:

- ✓ The respect of working relationships and their non-violation under any form. In addition to the respect of the laws that organize it.
 - ✓ Being aware of the importance of guaranteed employment to workers as individuals and as a whole society.
 - ✓ The importance of adopting an effective planning of the labour force in order to avoid the over dependence on temporary workers.
 - ✓ Providing the representatives of employees with clear and realistic information and on a timely manner.
 - ✓ The equal chances to access jobs for individuals no matter their gender, disabilities, Immigrants or age.
- **The conditions of work and social protection:** this concerns salaries, indemnifications, working hours, rest hours, official holidays, disciplinary practices and the balance between work and personal life. It is governed by laws, systems, agreements and employers conditions. Social security refers to all guarantees that are related to the reduction or the loss of revenue in cases of sickness, accidents, marriage, unemployment and physical disability. These guarantees must be in accordance with the national laws and with the international labor standards concerning the salaries level, number of working hours, so that they take into consideration rest times, holidays and religious events. In addition to the bonuses of extra hours at work.
- **The social dialogue:** It includes all types of negotiation and consulting, or the exchange of information between the representatives of the state, employers and workers about the issues that are related to common economic and social interests. This dialogue can take multiple forms such as the information at the level of the company or the mechanisms of consulting. The dialogue also provides a mechanism to formulate and solve problems concerning the needs of both employers and employees.
- **Health and security at work :** The aim here is to reach the highest levels of welfare, mental and physical care to employees on a regular basis. This can be accomplished by the procedures that can prevent any casualty that can hurt employees. In addition to providing the adequate professional atmosphere that answers the physiological and the psychological needs of employees, especially when we know that it is very costly for a company to deal with health incidents at work. This subject has gained a lot of attention on the international level. There is now a standard under the name of ISO 18001 that deals with occupational health and safety management systems. It mainly aims to ensure the existence of health and safety protection policies, planning needs, execution needs, examination needs and review needs.

III The relation between HFE and CSR:

CSR in industrial businesses is synonym to the protection of employees against the risks of injuries at work as well as allowing them to enjoy their rights. HFE is considered as a result of CSR towards the work environment. The relationship between human engineering and social responsibility can be clarified in the following three aspects:

1 Employees' right

HFE aims to provide the employee with the right to safety. This is exactly what social responsibility tries to do. This is usually achieved through the protection and the defense of the employee. Protection means preventing employees from any harm using multiple procedures. The study of (Dagiliene in 2010) and the study of (Brammer Millington & Rayton in 2007), as well as the study of Turker in 2009 have asserted that if the company takes in charge the problem of employees at work, such as the rise of salaries, higher life standards such as lodging, medical care, education, this will certainly enhance the loyalty of employees toward their company, and thus results in higher productivity, efficiency and higher sales volume. (UlleUbius)¹³, (Daniel Korshun C).¹⁴

Based on the 120 studies that were conducted in the HI-RES project, Totterdill admitted in 2004, that the new forms of labour organization that are based on participation and trust can provide many advantages such as competitiveness through successful innovation of products, services and operations. The study of the relationship between labor organization and innovation in 15 European countries highlights the importance of trusting employees. In fact, the study found that innovation and ingenuity among employees is very high when they are given the freedom of acting and solving problems.¹⁵

2 Professional safety (industrial security)

It is meant by professional safety, or industrial security health and professional safety, the protection of employees regardless of their type or nature of duties from the dangers that are related to their jobs. This is usually done by the execution and the follow up of programs that aim to reduce the number of labor accidents that face employees while doing their job. In addition to the removal of any potential dangers that lead to them. The study of HFE can significantly contribute to reach this objective. It can be achieved through the provision of the adequate means that can protect employees from these dangers. And so, CSR requirements can be reached when employees' rights are guaranteed. This is sustained by the findings of a study that has been conducted by the European commission in 2006. In fact, the study found out that the creation of adequate work environment, including putting a lot of trust in employees and giving them more attention, welfare and life quality can make working sites more appropriate to ingenuity which will result in higher productivity.¹⁶

3 The design of HFE (the design of workplace, machines and equipments):

HFE is the attempt to design the industrial operations, the required workspaces and the consumer goods in such a way that the work conditions are at their best and the employees execute their tasks with minimum stress. In fact, the design of the work site in an appropriate way helps providing security, which will impact the social dimension of CSR. For instance, the design of the working site requires taking in consideration the location of machines, so that it becomes easy to control and to properly run them. Concerning the organization of machines and equipment, the body characteristics of the working individual are also taken into consideration. All this will enhance employees' loyalty to the company.

Section 2: The Empirical Study

After that having dealt with the relationship between HFE and CSR from the theoretical dimension, we will attempt to figure out how can HFE help achieving the goals of the company when it comes to CSR towards employees. In this section, we will conduct an empirical study on of the largest state owned companies that produces cement in Algeria. It is the company of Ain El Kebira for the production of cement (SCAEK) –Setif-.

In order to perform the study, we will go through the following steps:

I Introduction of the company

The company is located near the town of Ain El Kebira, about 27 kilometers from the city of Setif. Its social headquarter is located downtown Setif. Its capital is equal to 1550.000.000 DZD (15 500 000 Euros). It is implanted on a 24 hectare surface. In 1978, it started the production with a theoretical capacity of one million tons of cement per year. It is considered as one of the most important companies in Algeria when it comes to cement production.

In 1982 and with the arrival of restructuration policies, the name of the company has been modified from “The National Company of Construction Materials” to “The Regional Company of Eastern Cement” (ERCE). In 1982, the company has become a subsidiary under the name “Cement Company of Ain Kebira” (SCAEEK).

1 Technical specifications about the company

In order to ensure an appropriate production in the best conditions, the cement company of Ain El Kebira has guaranteed 6 units with different production capacities as shown in the following table:

Table 1: The production capacity by unit

Workshops maximal capacity	Production capacity
Crushing plant	1000(Tons)
Other additives	170
Iron crushing Workshop	60
Grinding plant :With storage capacity is estimated at 20000 Tons.	365
Cooking Workshop: With storage capacity of clinker is estimated at 70,000 tons.	125
Cement grinding plant : With storage capacity is estimated at 40,000tons.	180
Cement shipment Workshop	
- Cement in bags	480
- Cement without bags	450

2 Human resources and types of products:

SCAEEK employs about 398 individuals between executives, technicians and managers. It produces two types of cement, the Portland cement that is used in constructions, and technically known as CPJ 42.5 and the Sulfur resistant cement that is known as CRS 400. The theoretical total capacity of production of the company is about one ton per year. However, the company has never been able to reach this level until the year of 2000. In 2014, the total produced quantity, both types of cement mixed has reached 1310148 tons. A production that exceeds the theoretical capacity by more than 31%.

II The impact of applying HFE on the enforcement of CSR towards employees

The evaluation of the social performance of the company starts with the evaluation of its performance in the fields of health, professional safety, training, employees’ rights and job satisfaction, in addition to the attempt of application of HFE in order to enhance CSR towards employees. This has led our company to really start introducing multiple organizational ways that are related to safety and professional health. A separate administration has been particularly created in order to deal with this issues and put the safety of employees as a first priority, especially when it comes to technicians and executives because they are much more exposed to risk. The company has adopted the

health and professional safety program OHSAS 18001 in 2011. This has led to the reduction of work accidents to 3, in addition to the reduction of risk degrees and repeated accidents indicators.

1 The role of the application of HFE in the protection of employees' rights

Since SCAEK is a state owned company, the employees' rights are fully guaranteed according to laws. In addition, the employees of the company benefit from:

a) **The right to training and formation:** Training is considered as one of the most important dimensions in HFE. In fact, training teaches individuals the appropriate ways to watch for physical issues (that are in relation with HFE) and to detect the optimal ways of using machines, equipment and furniture, so that it fits with each employee's body characteristics. The interest in the operation of formation goes in the context of improving the social performance of the company. This is why the company offers to its employees many types of trainings whether internally or externally, in or outside the country. In addition, the company also coordinates training and formations with its production goals, quality and environment protection. The human resources department is the one in charge of training and formation. At the beginning of each year, and based on the targeted quality of production, the department collects all the training needs from each unit. Then comes the role of human engineering which is the analysis of the nature of the job and the definition of training needs. This is usually done in coordination with the heads of services. At the end, a training plan is set in place as well as the necessary budget set for the operation. In the years of 2010 and 2011, the company has spent more than 110771 Euros and 82753 Euros respectively on trainings for employees in different positions. The annual training plan aims to:

- ✓ Habilitating a large number of employees,
- ✓ Adapting human resources to new techniques,
- ✓ Promoting the employees' careers,
- ✓ Developing the capacities of graduate employees, in accordance with the used means inside the company,
- ✓ Recycling old employees' abilities;
- ✓ Training a selection of students that are issued from national centers of formation and apprenticeship;

433 individuals were concerned by this plan and a consequent budget was devoted to it.

The right to fair wages: Wages are among the most important elements that influence job satisfaction among employees and guarantee good relationships with the managers. This, in return, will increase the ability and the desire of the employees to work and improve their productivity along with the products quality. In order to guarantee the just attribution of wages, the human resources managers, based on the principles of HFE, will define the structure of wages and salaries according to the characteristics of the task to be accomplished, the job vacancy, the corresponding wage grid, the education, the obtained degrees and the professional experience.

In the SCAEK company the wage is composed of three parts:

- The fixed part: it concerns the baseband pay and the indemnities.
- The varying part: subject to rises according to individual and collective productivity.

- Deductions: it concerns the social charges that are related to social insurance and taxes of about 9%.

The current wages grid aims to encourage employees and improve their effectiveness through potential baseband pay rises. This usually occurs in the cases of promotions and significant professional experience. The rise of wages according to experience is organized as following:

- The rise of 2% to employees who have from 1 up to 10 years of experience.
- The rise of 2.5% to employees who have from 11 to 15 years of experience.
- The rise of 3% to employees who have from 16 up to 20 years of experience.
- The rise of 3.5% to employees who have from 21 to 30 years of experience.

Table 2: The evolution of wages on a yearly basis 2003-2013

Year	Total annual wages (Euros)	Average wage per employee (Euros)
2003	3413172	571
2004	3294884	637
2005	2853286	615
2006	2788117	627
2007	3762822	890
2008	4082843	909
2009	4009935	850
2010	4020363	900
2011	3836888	857
2012	3996917	826
2013	5694111	1165

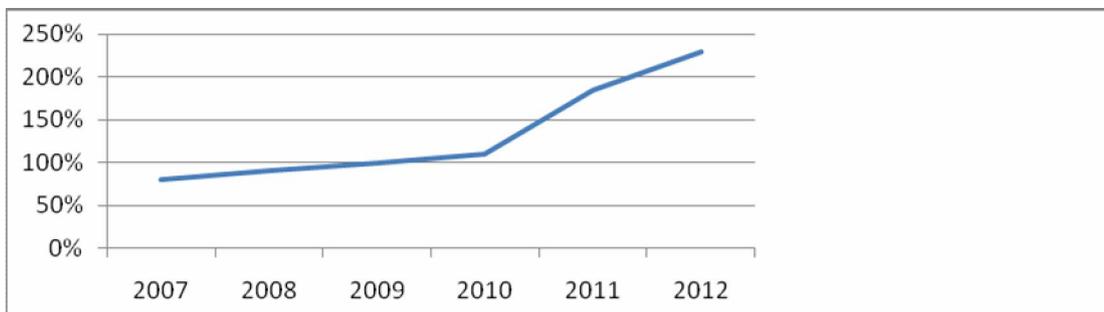
Source: The Company’s wages service

According to the previous table, we can see that wages are in a continuous improvement and this during the period of 2003 up to 2013.

Wages have reached the top in 2013 with a total of more than 5694 million Euros. This has significantly improved the average income of employees. These results also show that the company tries to provide employees with a good standard of living. The latter point has significantly improved the image of the company.

b) The equitable distribution of annual premiums: At the end of the year, the company distributes a part of the profits on employees in a equitable way. This is clarified in the following figure:

Figure 1: The evolution of the percentage of distributed profits



Source: the company’s wages service

It is clear from figure 1 that the percentage of premiums is in a continuous rise. In fact, it has doubled 1.5 times the average. This is a clear indicator that the company cares a lot about employees’ loyalty.

c) **The right of transportation:** The Company takes in charge the transportation of all classes of employees. In fact, it rents many types of transportation systems under annual contracts of a determined value. The employees who do not profit from the transportation system receive an indemnification.

d) **The right to information:** The Company tries its best to communicate information to employees, whether it is related to the working method or any specified conditions or ways of production. It also publishes documents that contain information about its policies.

e) **Employing individuals with special needs:** Special needs employees are employed at the central direction of the company.

2 The contribution of human engineering to professional safety (industrial security)

As stated before, HFE is the study of the interactions between individuals from a physical point of view with their functions inside the company. It tries to understand the degree of response of the employee with the nature of the job and the equipment that are used, in addition to the general environment at work. The main aim behind this is to provide employees with a safe, non-stressful and highly productive environment. The SCAEK Company believes that the employees good feelings and the good organizational environment can highly influence job satisfaction among employees. The company believes that when employees feel safe about their jobs, they will be more competitive and more productive. This is why it always gives priority to preventive health and employees' safety, in addition to the improvement of the work environment so that it matches the legal requirements. All this is done in order to achieve the objective of zero accident.

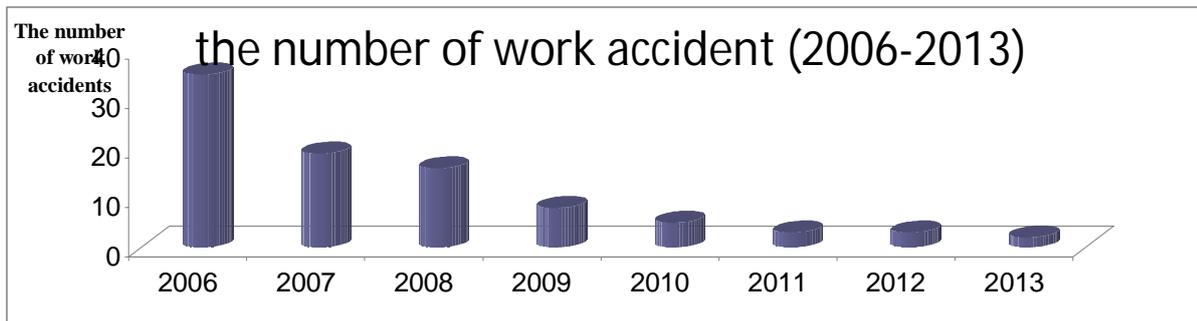
a) **The prevention of work accidents:** HFE tries to provide employees with protection against work accidents inside industrial companies. There is strong evidence that stress badly influences hearing and sight capacities of employees. This will lead to the deterioration of the nervous system. If stress gets higher, the employee will feel stress and inconvenience, in addition to a lack of concentration. This is why, noise is adjusted to the levels that are required by governmental laws. The SCAEK company carefully respects laws and provides employees with special equipments that help reducing noise. The company also provides the best quality equipment that perfectly matches the job characteristics. It also obliges workers to wear special garments such as helmets, glasses, gloves and boots. In addition, it makes it compulsory for employees who work on places that are higher than 3 meters to wear special security belts in order to avoid any accidents. The next figure shows the extent to which the SCAEK Company cares about its employees through the registered work accidents.

Table 2: The evolution of the number of work accidents and its different indicators

Year	The number of work accidents	Duplicates index	Lost days due to the injury	Risk ratio
2006	35	52.92	404	0.61
2007	19	21.92	265	0.31
2008	16	19.2	141	0.27
2009	8	8.96	76	0.08
2010	5	22.46	75	0.97
2011	3	17.44	112	0.17
2012	3	15.90	90	0.15
2013	2	6.11	60	0.15

Source: the company's security service.

Figure 2: The evolution of the number of work accidents before and after the obtaining of the OHSAS 18001 certificate



Source: the company’s security service

The high number of accidents has pushed the company to take all the necessary decisions to protect its employees. At the present time, work accidents have gradually decreased and are at their lowest level. However, the company is aiming to reach zero work accidents in the future.

b) **The guarantee of professional safety:** Inside the production units, the company has enabled a medical center that is managed by a permanent doctor and a nurse. They have the mission of:

- Vaccinating employees from multiple diseases;
- Following the health status of employees;
- Performing onsite regular controls of the employees’ health status;
- Providing employees with the necessary tools to reduce their exposure to dust.

Table 3: The evolution of the number of employees (2000-2013)

Year	Number of Workers	Change (%)
2000	525	-
2001	515	1,90
2002	511	-0,99
2003	498	-2,54
2004	431	-13,45
2005	386	-10,40
2006	370	-4,14
2007	352	-4,86
2008	374	6,25
2009	393	5,08
2010	372	-5,34
2011	377	0,26
2012	403	8,04
2013	407	0,99

Source: the company’s security service

Table 3 shows that the number of employees is in a continuous increase especially during the last year. Some have left other public or private companies to join SCAEK. This is mainly due to their trust in the company. In addition to the fact that it tries to maximize the welfare, the health and the safety of its employees.

3 The design of HFE (the design of the worksite, machines and equipments) in SCAEK

a) The design of the dust reduction program: Despite offering high salaries, SCAEK couldn't attract high competence employees because, until 2006, its image was tarnished by its emitting of many undesirable atmosphere pollutants inside and outside the plant. In order to tackle this problem, the company established, in 2006, a specific program on all the functional levels. It has taken into hands the management of environment quality in order to reduce dust emission from 50g/Nm^3 to 10mg/Nm^3 . This has been achieved after replacing the old electro filters, used for dedusting, by new ones called bag filters characterized by a much more cleaning efficiency. The company has also created a program of waste management that was due to reduce the volume of produced wastes.

To achieve these objectives, all the financial and the human resources have been mobilized. More precisely 23% of the annual returns have been allocated to the protection of the environment in 2006.

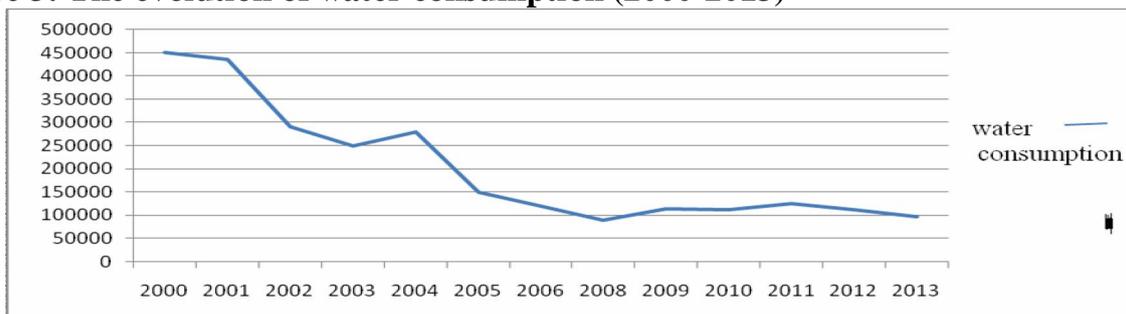
- The installation of a bag filter at the milling unit. This is considered as the latest technology in the field. In fact, it can completely contain all dust emissions at this level of the production process. The cost of the filter is estimated at about One Million Euros with an annual amortization of 7%.
- The installation, in 2009, of a new filter at the cooking unit in order to process the produced gazes from the oven. The cost of the filter is estimated at 2 238 215 Euros.
- The company has also replaced the nozzle of the oven with a rotary flame nozzle. This has significantly reduced the volume of emitted gases.
- The installation of two new filters at the cement zone namely, the bag filters instead of the electro filters. These new filters contributed to reduce the volume of dust emitted in the atmosphere. Their cost is about 42 Millions Euros.
- In 2010, a specialized company has been assigned the mission of clearing the factory surroundings and the liquidation of solid wastes. The cost of the project is about 72 000 Euros.

Besides reducing all kinds of emissions, the replacement of the old filters by new ones, using another technology, contributed also to:

- the reduction of the quantity consumed of water. This is due to the fact that the old filters needed huge quantities of water,
- the increase of the quantity of cement produced and hence the employees' productivity. This increase in the quantity produced can be attributed to the efficiency of the new filters in recuperating big quantities of cement which used to be emitted in the atmosphere before replacing the old filters.

All this is sustained by the next figures.

Figure 3: The evolution of water consumption (2000-2013)

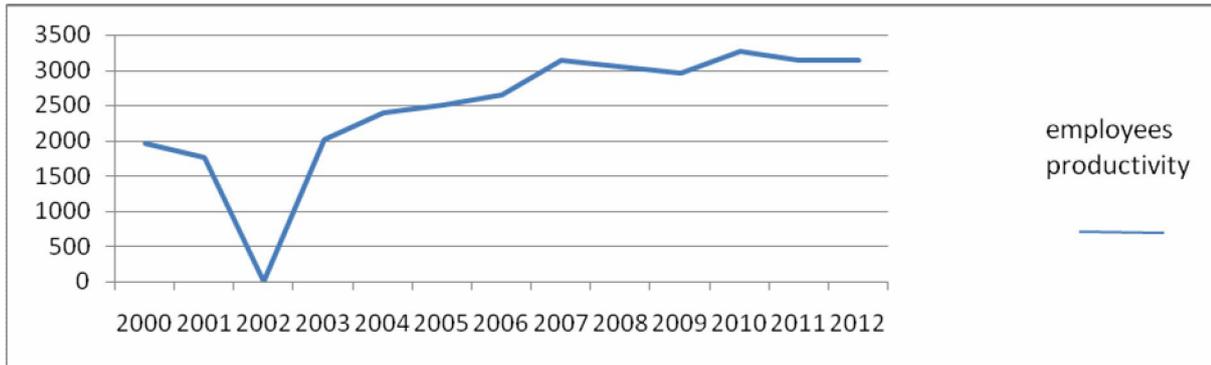


Source: the company's Environmental service .

The previous figure shows the continuous decline in the annual consumption of water during the period of 2000 up to 2013. In fact, water consumption has been reduced by 25% in 2008 after the obtaining of the ISO 14000 certificate.

The analysis of the evolution of work productivity: the productivity of employees signifies the participation in the production whether by quantity or by value. It is calculated by dividing the volume of production on the number of employees.

Figure 4: The evolution of employees' productivity (Tons/employee)



Source: the company's Data

The previous figure shows a continuous improvement in the employees' productivity. However in 2002, the productivity has decreased due to the installation of new equipments and several other maintenance tasks.

b) **The design of the operation's control program:** The SCAEK Company has identified the operational aspects that have to be followed, through preparation and response to any emergencies that are represented as public notices around the factory. These public notices contain a series of instructions that must be followed by employees. In addition, employees are obliged to wear helmets, glasses, gloves and boots in order to minimize the potential work accidents.

c) **The design of the documentation program:** The Company stores all the detailed information and the procedures that are related to accidents through an electronic document management system (EDMS).

d) **The design of the communication program:** In order to guarantee the permanent communication between the different actors and the reduction of the amount of time that is necessary for the acquirement of information, the company has provided most of employees with internet connection and specialized software such as outlook, Gomoa and Pyciny.

e) **The design of work offices:** Conscious that a comfortable work space can be of great help in motivating its office employees, the Company decided to replace outdated office equipments by adjustable desks and chairs that can be raised and lowered for everyone. This has significantly helped in reducing effort, boredom and stress. It also helped to avoid the static position while sitting or standing for long periods of time.

Conclusion:

Our analysis suggests that even if CSR embraces a wider range of issues and practices than HFE does, the two are inextricably linked. Moreover, we can say that HFE can be of great help to CSR when it comes to designing and implementing its social dimension inside the company. As far as our case study is concerned, we found that the

SCAEK Company managers, who embarked on a strategy that had as a sole objective the reduction of all kinds of polluting emissions, did not stop when they achieved their objective, but continued along their encouraging path setting up new measures in favour of their employees. The latter, stimulated by their new work environment, appreciating the care and attention they receive, conscious of the dangers of competition coming from other cement companies, decided to spare no effort to raise their productivity. This in fact resulted in a sensible increase in the quantity produced. As a concluding remark, we can say that the right combination of CSR and HFE can result in a "win-win" situation. However, we think that more empirical follow-up studies are needed to investigate that relationship in detail.

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