

Capitalization of the Operating Experience of a Company for Sustainable Improvement

The Case of the ETRAG Foundry, Constantine, Algeria

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Abstract-Today, the adaptation to the effects of changing behavior and attitudes of Algerian companies has become a necessity. The current work aims to provide real-time information drawn from the field involvement with the use of performance indicators, in order to have a global vision of the general situation of the company. This allows for fulfilling functions such as awareness, guidance, decision support, and strategic planning. These indicators form a key data synthesis that affects all areas of the company's affairs. Based on these indicators, a manager could have a better view of the business. Consequently, he could act effectively to correct the errors that have been revealed or continue in increasing the company's development. This article describes the progress of management practices improvement in a foundry of the ETRAG company while relying on employee involvement. Through this work, the necessary preventive measures are established in the occupational environment ensuring the health and safety of employees. Thus, the well-being of the employees and the improvement of the working conditions can be assessed. The proposed work methodology consists of two components: the survey results obtained through a questionnaire in order to quantify the most exposed to risks and its intersection employees with the solutions proposed by the same employees. This approach aims at optimizing processes, instill a culture to the effects of changing attitudes and behaviors, to spread the culture of continuous and sustainable progress within a company, to ensure a good workplace atmosphere, and to have a respectful attitude towards employees.

Keywords-indicators; performance; health; safety; sustainability; strategic planning and decision support; Gemba walks

I. INTRODUCTION

Adaptation to the effects of changing behavior and attitudes has today become a necessity and an essential step in

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preserving the employee's safety and business sustainability. The adaptation involves changes in behavior, management style, and governance [1]. The adaptation tools aim to improve the knowledge and understanding of issues and outcomes or even to support decision-making and engagement in a process of continuous improvement [2]. Continuous improvement culture could not be sustained if managers and employees are not deeply involved in the process, which is known as a key role in a successful lean implementation [3]. Hence, in order to develop and maintain a competitive advantage, a company must be efficient in its operations [4, 5]. This can only be done by establishing a list of performance indicators to give the manager an overall view of the state of occupational health and safety [6-8]. These performance indicators form the key data synthesis of the company [9]. Based on these indicators, the manager may quickly know if his business is going well or not. Thus, managing to provide information that offers a real time global vision on the general situation of the company based on field participation allows the company to accomplish functions such as awareness, guidance, decision support, and occupational health and safety strategy planning. These indicators represent a real dashboard that provides concrete and operational information for all companies [10, 11]. In the future, the performance improvement will become a daily concern which should be established as a common culture for all companies.

II. PROBLEMATIC

Over the years, the corporate performance issue and its measurement have become a recurring theme. It is true that in a highly competitive world, regular evaluation is crucial to ensure that things are going right in a company, provided of course that the right actions have been implemented at the right time and that there are adequate means to achieve the set goals.

Consequently, adaptation to the effects of change involves changes in behavior, management methods, and governance, while making the best use of the available resources, including employees. Thus, the review is conducted by the people involved in the activity. As a result, the employees' involvement in identifying problems and solving them is of paramount importance in the process of continuous improvement [12]. In fact, people confronted on a daily basis with the reality of the field are the best to report problems and to propose solutions [13]. This can serve as a motivation form which leads towards productivity [14]. They can contribute greatly to the continuous improvement cycle by feeding the processes of new knowledge from the field of accumulated experience. This allows highlighting the company's elements that perform well in real time. In order to get closer to this perfection state, it is possible to use some tools like the Gemba Walk, the most basic element of lean leadership which describes the cooperation of employees and leaders in their mutual striving for perfection [13]. Gemba means the "real place" and is often referred to as the place where value added activities occur and allow leadership identifying inadequate management systems [15-17]. It inspires the finding of ways to improve processes by seeking the help of the employees [18]. It is therefore important that they feel confident and are encouraged to make proposals and implement changes. In addition, the more the employees become accustomed to solving problems, the easier it will be for them to react to future unpredictable situations. Thus preserving the company's sustainability and even being more responsive to the changes imposed by the circumstances. The Gemba Walk tool promotes a measurement culture that aims to understand the best strategy to achieve a given goal [19]. Thus, teamwork and information exchange can be promoted while appealing to the collective intelligence and experience to enrich the proposals for solutions [20]. Once the information collection has been completed, the manager is simply asked to make a precise analysis, by putting in place the necessary corrective measures and ensure the follow-up between the regular Gemba walk sessions. This approach is a part of the continuous improvement logic, with the objectives of boosting performance and ensuring the sustainability of the company.

III. CASE STUDY: THE ETRAG FOUNDRY, CONSTANTINE, ALGERIA

The motor-tractor complex ETRAG is an economical public company ("Complex Motors Tractors Spa" (EPE / CMT Spa)), producing thermal engines and agricultural tractors, located in the industrial area of Oued Hamimine-Khroub district of Constantine, Algeria [22]. It was created to meet the growing needs of the national market in agricultural tractors and spare parts and to contribute to the mechanization of national agriculture, with the following objectives:

- The manufacturing and development of agricultural tractors and spare parts. The foundry manufactures and sells agricultural tractors from 68HP to 100HP of 2 and 4WD.
- Subcontracting in the activities of foundry, blacksmithing, boiler making, mechanical machining, heat treatment, and tool manufacturing.

- After-sales service and renovation of tractors.

Among the most important of these workshops, from the health and safety at work point of view, is the foundry workshop, the study field (Figure 1). The latter represents a major challenge, with its working atmosphere (dust and smoke) and activities nature. This building generates the highest accident risk and occupational diseases (silicosis and cancer).

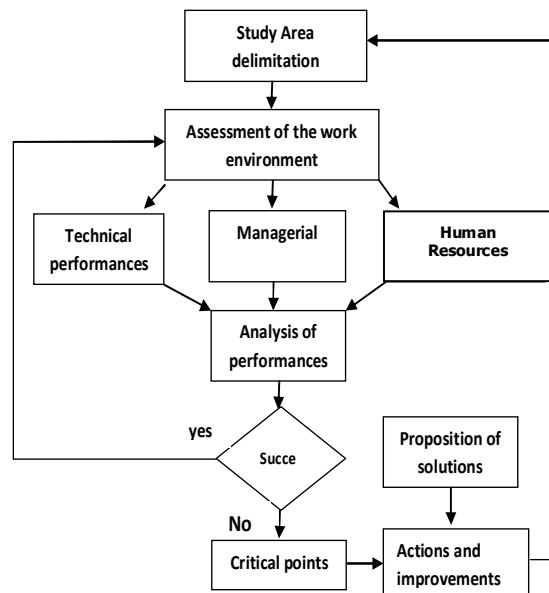


Fig. 1. The proposed assessment model of the work environment.

IV. THE ANALYSIS APPROACH

The main objective of this work has been to use the Gemba tool in order to assess the overall work environment process by involving everyone touching the process to answer a questionnaire in order to have a clear view of the situation and existing problems which may help in taking appropriate decisions and improve management practices [21]. A healthy enterprise is an organization where managers and staff are working together to design a health-promoting work environment [22]. Any risk assessment process is doomed to fail without the participation of all stakeholders. This approach aims at optimizing processes, instill a safe culture and spread the culture of continuous and sustainable progress within the company [23]. Another goal is to change workers and managers' awareness of this issue and suggest ways to improve it. The work environment assessment' model consists of the following steps:

- Assessment of the working environment and identification of weak points and sources of risk at the foundry using a questionnaire addressed to all employees working in the foundry.
- Processing of the questionnaire results.
- The obtained survey results are cross-checked with the solutions proposed by the same employees.

- The intervention of the manager to adjust his strategy, correct the errors that have been revealed and refocus on priorities.

The survey used in this work is a single questionnaire administered face-to-face to the employees. This technique is classified as one of three major methods to study psychosocial facts in order to gather information to understand and explain them [24]. It consists of well-formed questions to get essential information about the working environment, especially the health risks diffused through the workshop. The questions should highlight the problems and improvement zones on the workplace. The questions focus on the organization characteristics, the communication, the workstation, the working environment, and the risks generated in each activity of the foundry. Several simple questions were asked about each theme. The answers are often of YES or NO type. The number of employees that responded positively to this survey was 99 out of 146, which represents a rate of 67%.

V. SURVEY RESULTS

The results were processed with the Statistical Package for Social Science (SPSS).

A. Organizational Results

The goal of the organizational survey is to build a strategy developed in consultation with employees in a perspective of continuous improvement. It is a fundamental element of the occupational conditions that allow any organization to be competitive. Henceforth, it is the reference frame by which any company ensures the continuity of its activities.

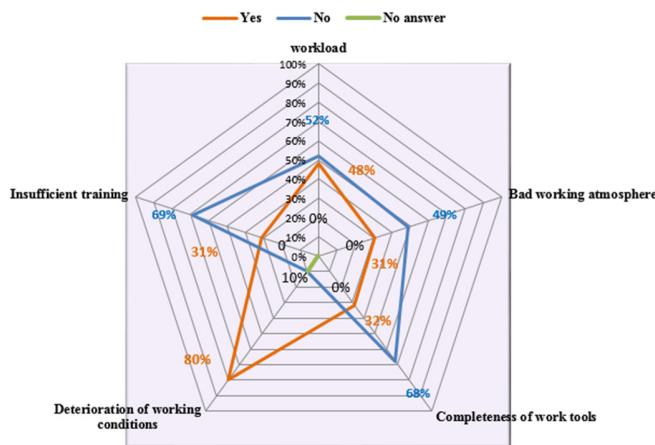


Fig. 2. Organizational survey results.

According to the obtained results shown in Figure 2, it can be found that 60.6% of employees are not satisfied with their working conditions, because of the bad working atmosphere, the lack of staff, and the workload. The latter is associated with practice performance [25]. More than half of the workers say that training is insufficient. In addition, 80% of employees find that working conditions are deteriorating from one year to another, which is the most important point to be corrected urgently: a new management strategy is therefore required.

B. Material Conditions Survey

Its objective is the improvement of the conditions and life quality at work given its importance and its crucial role in the companies which favours the well-being of the workers and the productivity success, see Figure 3.

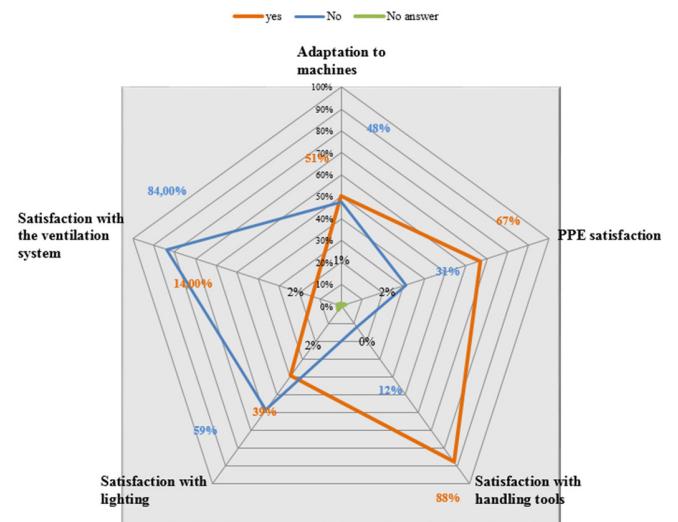


Fig. 3. The investigation results of material conditions.

Most employees declared that PPE and handling equipment are available and adequate, which is a very strong point for the company. Meanwhile, the employees complain about the lighting and the ventilation system in the foundry. These negative points should be resolved since the physical environment plays a key role.

C. Communication Survey

Its objective is to set up a reliable information system that can measure in a sustainable manner the dynamics set up at the organization and constitute a dashboard concerning the management of actions. Communication is an essential link in any sustainable development process and requires the implementation of an open, permanent and balanced communication strategy.

The relationship between the administration and the workers is considered insufficient as there is a lack of information and motivation. Working conditions can lead to internal conflicts. As we can see in Figure 4, 66% of employees report inadequate internal communication, 60% of them say that the instructions are contradictory, and more than 14% have conflicts with the line manager. Coherence and consistency among the various structures and systems, hence "structural conflict" should be avoided [26]. As a conclusion, we may say that internal communication is insufficient in the foundry. In the context of Gemba, the leader uses communication to connect with the employee and assess failures and errors of processes [18]. To gain a dynamic and profitable company, the communication between the employees and the managers is a very important factor. Strong corporate identity ensures that all internal and external communication is coherent and consistent

[27]. In the future, the company should review its communication system and activate the implementation of an open, permanent, and balanced communication strategy.

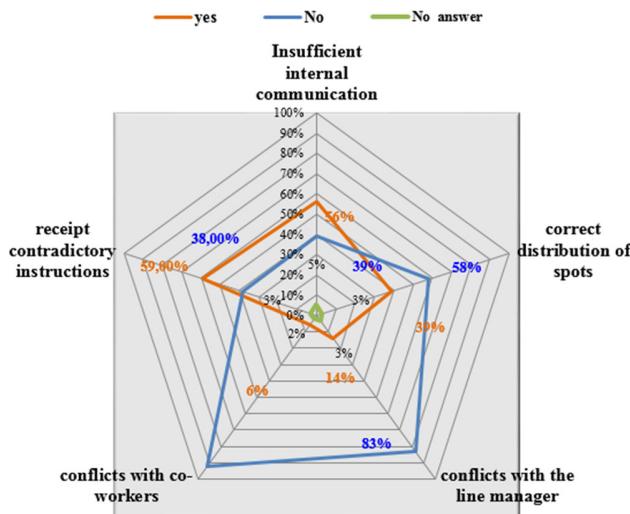


Fig. 4. Communication survey results.

D. Workstation Survey

Its goal is to gain a good understanding of everyone's role in the company's strategy, with a clear perception of its added value and sense of purpose. In everyday life, prevention of risky behavior must be carried out. It is necessary to be attentive to weak signals and to avoid the so-called "toxic" management behaviors. Many toxic managers succeed by achieving short-term goals, but at the same time they may damage the organization by creating a negative environment impacting on the dependent variables of increased turnover, high absenteeism, and low productivity [28].

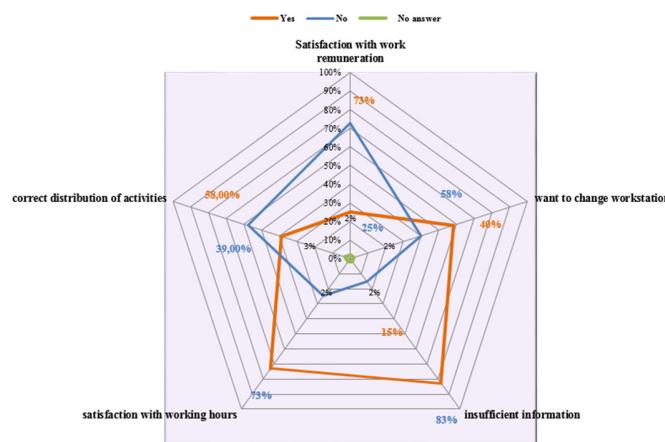


Fig. 5. Workstation survey results.

In Figure 5 we can see the results of the Workstation Survey. It can be seen that most employees are not satisfied with their jobs. It was found that 56.6% of workers want to

change job and 70% of them are not satisfied with their payment, the most common problem in most previous studies [29, 30]. This explains the non-compatibility of studies and training with the desired job by the employee. In addition, with an information deficit of 83% at the workplace this is the most negative point and must be resolved urgently. Sufficient information and knowledge sharing makes a big difference on an enterprise. Knowledge sharing is most important because the more stronger the knowledge sharing of an organization is, the greater degree of effectiveness the organizational will have [14, 31].

E. Occupational Health and Safety Survey

Its goal is to achieve a more human atmosphere at work, where trust in everyone is strong, and going to work becomes a pleasure. It shows a better performance of the company. The survey results can be seen in Figure 6.

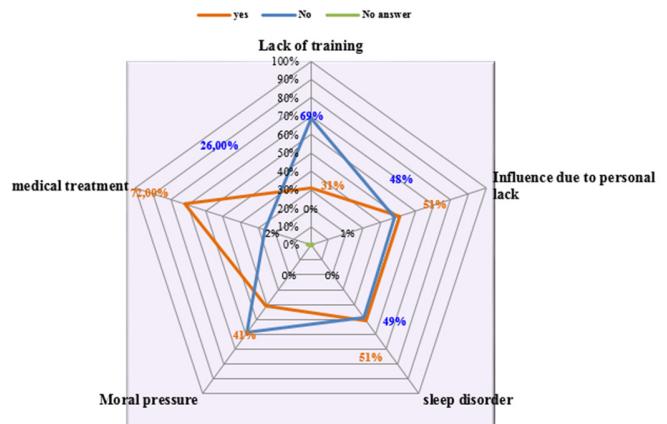


Fig. 6. Occupational health and safety survey results.

The majority (71%) of the employees report that follow-up and medical treatment is always available. Meanwhile, no employee is secure from illness and work-related accidents, which shows that more work is needed to improve safety conditions and well-being at work, hence a risk assessment is required. This justifies the adoption of technical and organizational measures, mainly in the area of management, information and staff participation. For the improvement of the health and safety of employees, every company must engage in a continuous improvement process [2] and manage each existing risk [33].

F. Spider Chart of Working Conditions

In order to obtain an overall view of the general situation of the company, all the obtained results are reported on a rating grid represented in the form of a spider chart. The results (Figure 7) clearly show that standard management practices are insufficient.

In general, the assessment of the occupational environment is insufficient since all components are in the 25-50% range, which requires an emergency action plan for the safeguarding and sustainability of the company. It can be noted that the organizational component is insufficient (32%) and requires some improvements. The other components change positively

in favour of improvement, given that the material and workstation components are considered acceptable. This result is a strong advocacy for a holistic approach in which safety is an essential aspect, but is only a part of a broader prevention and promotion policy for health and wellbeing at work. The approach initiated by this study aims at providing tangible demonstration elements in the positive approach of sustainable and continuous improvement. This approach can be extended to other sectors of industrial activity with different parameters.



Fig. 7. The assessment representation of working conditions.

G. Solutions Proposed by the Employees

The employees were asked to propose candidate solutions that could improve the working environment (feeling of being listened and of participating in the decision). The results are listed in Figure 8.

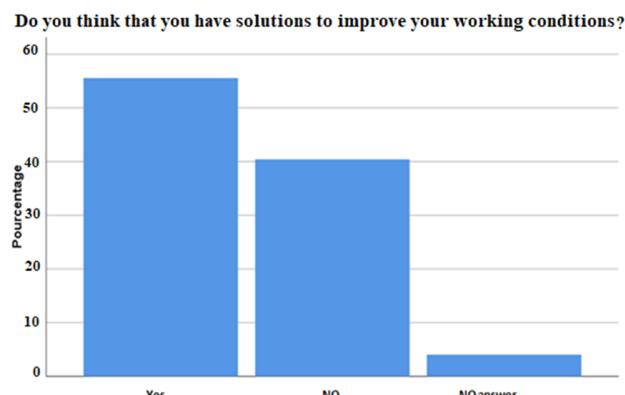


Fig. 8. Survey results showing the employees involved in suggesting improvement solutions.

More than half of the employees have proposals to improve the current situation. The most important thing is that the proposed solutions were helpful to the company. Given the difference in the intellectual levels of the employees, we tried to group together similar propositions and we classified them in order of quotations, with the employee number that proposed each item in parentheses. The results are:

- Repair of the ventilation system (54)

- Lighting enhancement (52)
- Arrangement of break times (44)
- Organization of periodic medical check-ups for employees (38)
- The creation of a committee for the health and safety service and working conditions (35)
- Improvement of working conditions (35)
- Cleaning and maintenance of work premises (35)
- Facilitation of internal communication and the link between the workers and the administration (34)
- Reduction of the retirement age and increase of the workforce (32)
- Organization of training for the employees (31)
- The establishment of protection and prevention means (26)
- Repairing or renewal of machines (25)
- Restructuring of the workshop (25)
- Maintenance of tools and work machines (25)
- The application of regulations (21)

VI. DISCUSSION, CONCLUSION, AND RECOMMANDATIONS

The study outcomes are a reflection of people's reality in their workplace. Henceforth, any assessment of the occupational environment is doomed to failure without the participation of all the actors and in particular the employees which are directly involved in the activity. More concretely, the study findings will allow better assessing of the action relevance of the executing agencies and will also increase their effectiveness through the objectives definition and adapted priorities to current concerns. This qualitative assessment represents a valuable gauge of the company's activity and helps anticipating and correcting dangerous situations. In order to develop a global performance approach, a permanent discussion between the strategic and operational spaces and in particular the employees will be way far helpful as it offers a great added value and provides necessary data. Experiments and feedback show that this is a collective and long-term learning.

Generally, the information synthesis will allow the decision-makers to correct the mistakes and to continue and increase the enterprise development. By proper evaluation of the business activity, the best decisions to maximize the employee's performance can be made. They not only allow knowing in detail the efficiency of the business, but they also provide useful informations about the quality of services of each workshop and each activity. In conclusion, the following points are recommended:

- The use of management tools to reorganize work. The organization of work includes many aspects, such as work pace, workload, number of people performing a job (staffing levels), workhours, and duration and number of

- rest breaks, which are relevant to avoiding workload and reaching the assigned goals.
- Any company willing to develop and maintain a competitive advantage and to be efficient in the way it operates, must base its actions on concrete and operational information drawn from the occupational environment.
 - Knowledge sources should be managed in order to facilitate access, knowledge reuse, and the circulation of information. Sufficient information must be provided to workers along with motivation and encouragement of co-operation between employees. Encouraging employees to be autonomous and responsible allows them to find positive work environment.
 - Integrate all elements of a safety program such as training, into a single management system that is owned by line management. Adapt workstations to employees, taking into account their health status and the division of tasks according to the hierarchical framework and competence of the workers, and encourage them to participate in safety efforts, where the safety is everyone's responsibility. Improve the compliance with laws and regulations.
 - Promote internal communication between the various levels and functions of the organization as well as external communication. Plan the communication to provide a space of exchange to enhance safety culture and solve existing problems.

Finally, in order to maintain a competitive advantage, every company should allow constant discussion and open dialogue between strategic and operational areas, particularly employees. These valued strategies offer a great added value and provide data from the field. Henceforth, any action plan should be taking into account the solutions proposed by the employees.

APPENDIX

The Questionnaire on the Working Conditions in the Foundry

Age: Years of experience:

Organization

1- Do you consider your working conditions?

Good Average Bad

2- Main reasons for dissatisfaction (several possible):

Workload too important Moral pressure Bad working atmosphere
Training Insufficient number of workers Too complex tools

3- Evolution of your working conditions the last 3 years:

Improved Are the same Have degraded

Material conditions:

4- Is the material, tool, machine fit to your task and safety? :

Yes No

5- Are there any means of personal protection (PPE)?

Yes No

6- If yes, which?

Helmet Anti noise Safety shoes

Gloves Glasses Mask

7- Are there any means of handling?

Yes No

8- How do you consider the lighting in your job post:

Sufficient Insufficient

9- Is there a ventilation system in your workstation?

Yes No

Management / Communication

10-The number of meetings with your line manager:

Sufficient Insufficient

11- The trust that your line manager gives you:

Sufficient Insufficient

12- Internal communication of your direction:

Sufficient Insufficient

13- Do you often receive contradictory instructions?

Yes No

14- When you have a problem can you talk about it:

Yes No

If so, to whom?.....

15- Do you consider that your line manager assumes his responsibilities?:

Yes No

16- Are you in conflict with your line manager?:

Often Sometimes Never

17- Are you in conflict with your colleagues?

Often Sometimes Never

18- If yes, do you think that conflicts are generated by working conditions?

Yes No

Your job

19- Does your position correspond to your skills?

Yes No

20- Do you value your job as fulfilling?

Yes No

21- Do you feel that you learn by working?

Yes No

22- Do you have useful information for your tasks?

Yes No

23- Do your working hours suit you?

Yes No

Specify why:

24- Is your remuneration appropriate for you?

Yes No

25- Is the division of tasks right?

	Yes	No	
26- Would you like to change job?			
	Yes	No	
<i>Your health</i>			
27- Are you able to reconcile your private life with your professional life?	Yes	No	
28- Have your working conditions affected your health?	Yes	No	
29- If so, how?			
Fatigue	Sleep disorder	Stress	Vertigo
Pathology	Irritation to the eyes	Kidney insufficiency	
Corneal TMS	Redness	Headache	Edema diabetes
Vision disorder	Hypertension or hypotension	Auditory issues	
30- Have you had any medical treatment on this subject?	Yes	No	
31- Have you ever had a thermal burn?	Yes	No	
32- Have you ever dropped down?	Yes	No	
33- If so, what happened to you?			
Contusions	Intorts	Injury	Fracture
34- Have you ever had an electrification accident?	Yes	No	
35- Was there any fatal accident?	Yes	No	
If yes what was the cause?			
.....			
36- Do you know anyone who works here and has had cancer?	Yes	No	
<i>Conclusion</i>			
37- Do you have an independent break time at the lunch break?	Yes	No	
38- Are there sanitary cabins?	Yes	No	
39- Do you think you have solutions to improve your working conditions?	Yes	No	
If so which?			
.....			

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