

EVALUATE COSTS RESULTING FROM WORK ACCIDENTS USING THE S.O.F METHOD CASE STUDY: BCR ENTERPRISE AT SETIF

تقييم التكاليف الناتجة عن حوادث العمل باستخدام طريقة S.O.F دراسة حالة: مؤسسة
BCR بسطيف

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Abstract:

This research aims to highlight the amount of costs resulting from work accidents and the amount of their impact on the performance, using the s.o.f method as a modern and comprehensive method, unlike the traditional methods that overlooked many aspects, especially its inability to define responsibilities and not evaluate costs in a correct and accurate manner, which complicates the management diagnosis Deep work accidents.

The research several results, the most important of which is the Foundation's significant productivity decrease due to work accidents on the one hand, which negatively affected performance mainly due to its significantly lower profitability and weak competitiveness due to an increase in the overall level of costs.

Keywords: work accidents; s.o.f method; enterprise performance; low profitability; BCR enterprise.

Jel Classification Codes: H21, M42.

ملخص:

يهدف هذا البحث إلى إبراز مقدار التكاليف الناتجة عن حوادث العمل ومقدار تأثيرها على أداء المؤسسة، باستخدام طريقة s.o.f باعتبارها طريقة حديثة وشاملة عكس الطرق التقليدية التي أغفلت جوانب كثيرة، خاصة عدم قدرتها على تحديد المسؤوليات وعدم تقييم التكاليف بطريقة صحيحة ودقيقة، مما يعقد على الإدارة التشخيص العميق لحوادث العمل وصعوبة اتخاذ القرارات المناسب وفي الوقت المناسب.

وتوصل البحث إلى عدة نتائج أهمها نقص إنتاجية المؤسسة بشكل كبير بسبب حوادث العمل من جهة، وتضييع المؤسسة لفرص تحقيق أرباح من جهة أخرى، مما أثر سلباً على أدائها والمتمثل أساساً في انخفاض ربحيتها بشكل كبير وضعف تنافسيتها بسبب زيادة المستوى العام للتكاليف، مما أدى إلى تقلص حصتها السوقية.

كلمات مفتاحية: حوادث العمل، طريقة S.O.F، أداء المؤسسة، انخفاض الربحية، مؤسسة BCR.

تصنيف JEL : H21 ، M42.

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1.INTRODUCTION:

Work accidents cost the organization high costs due to several factors, as they reflect bad working conditions and lack of control over machines and production means well, and this is evident in the shortage of production due to temporary stoppages of machines and the temporary absence of the injured worker, and all these factors result in costs and lost opportunities for the organization. It reflected negatively on its performance and competitiveness directly, so several methods appeared to evaluate the costs resulting from work accidents in order to make appropriate decisions, and the most important of these methods is the sof method, which represents an abbreviation of the phrase (Social; Organization; Financier) that was proposed by Henry Savall with his colleagues at the ISEOR Institute in France, This comprehensive method is based on three main measures:

- The social measure: The source of obtaining it is when studying a case through observation and investigation, in addition to the method of the questionnaire.
- The organizational measure: its source is from analyzing data (statistics, reports ... etc.) to know the different quantitative aspects of dysfunction in the

organization, in addition to knowing the methods of treatment by the administration.

- Financial measure: calculating the financial amounts related to controlling and treating dysfunction such as: lack of production, overtime ... etc.

1.1. The problem of the study

From the above, the following problem can be posed:

How effective is the assessment of costs arising from work accidents using the S.O.F method ?.

1.2. Study hypotheses

Based on the previous problem, the following hypotheses can be developed:

- Work accidents result in various and exorbitant costs that negatively affect the performance of the organization, especially the decrease in productivity and profitability.
- The S.O.F method is considered one of the best methods for evaluating the costs of work accidents in the organization compared to the traditional methods.
- The outputs of the S.O.F method help the organization to take appropriate and effective measures especially in strategic cost management.

1.3. Objectives of the study

The study aims to:

- Knowing the extent of the impact of work accidents on the performance of the organization as a whole, and trying to diagnose their true causes.
- Explaining how to apply the S.O.F method in the institution under study in a scientific and practical detail.
- Correct evaluation of the various costs resulting from work accidents, allowing the organization to improve its competitive position, in light of the great competition.

1.4. Study methodology

In this study we relied on the descriptive and analytical approach in the theoretical side, in addition to the case study methodology using the various documents of the institution, and the methodology of the questionnaire method to clarify the content of the social scale in the practical side.

2. General framework for costs

In this element, we will deal with defining costs and highlighting their characteristics, in addition to explaining how they are managed and strategically managed.

2.1. Definition of costs

The term costs is used frequently in the field of accounting and economics with different concepts due to the difference in objectives, and the “accounting objectives differ from the objectives of the economy, which leads to different definitions of cost. Accounting costs and economic costs are different.” (Legoff, 1993, p. 202)

Cost is defined from an accounting perspective as "the sum of the fees for a specific element within the accounting network." (Claude & Sabine , 2010, p. 47)

It is also defined as "an expression of the monetary value paid to obtain a good or service with the aim of obtaining its possession and property." (raimbault, 1996, p. 09)

The points of difference between the accounting and economic concept of costs lie at certain points, namely: (Raimblault, 1994, p. 80)

- in terms of the target.
- In terms of duration.
- In terms of the use of the information.

2.2. Cost characteristics

From these definitions, the main cost characteristics can be drawn which are:

- **Sacrifice:** The cost should be measured as a sacrifice made now or in the future, for a reduction in cash or other assets, or an increase in current or future liabilities.
- **Money value:** the use of resources is measured within the framework of the cash unit. These resources may be materials, wages and other services.
- **A specific objective:** When the economic sacrifice occurs, it must be associated with obtaining the benefit, so the cost must be associated with a specific goal.

There are three main components to cost: (Claude & Sabine , 2010, p. 48)

A- Scope: The cost range is very wide and includes the following:

- An economic function or a subsidiary function of the institution (production, distribution or management).
- A means of exploitation and also a center of responsibility.

B- Timing of calculation: This element distinguishes two types of costs:

- Historical cost: the cost calculated after the events that led to it.
- Predetermined cost: the cost computed before the events that will cause them.

C- Content: The cost can be calculated either by merging all costs recorded in the general accounts, or by including a part of these costs only.

2.3. Cost management and cost center identification

In view of the rapid developments at the economic and technological level, it was necessary for the organization to keep pace with it and work on cost management as "a major strategic tool for the organization that leads to the understanding and evaluation of the institution's efficiency in cost management." (Gerry , 2009, p. 56)

Leading institutions at the global level allocate centers to track costs with the aim of controlling them and working to reduce them, in addition to specifying

responsibilities between different levels in order to improve the overall performance and ensure the overall quality in the organization. It relates to predefined standards of quality. " (Olivier , 2009, p. 21)

2.4. Strategic Management of Costs

Controlling costs and reducing them to the lowest possible level requires a strategic management of the cost, which means “the process of tracking the cost over the life of the product in order to bring the cost to the lowest possible level, that is, it is intended to achieve efficiency in the use of materials, labor, machinery and other factors of production and supply Management with data on various aspects of activity, it is an integrated and comprehensive approach that relies on consistent methods and tools in order to achieve a competitive advantage by focusing on the organization's strategy, the drivers of costs, continuous cost reduction, and the goal of strategic cost management is to achieve a competitive advantage and maximize profits in the two-term and add A value for stakeholders, and reducing costs while maintaining customer requirements, it was necessary to apply modern management methods that work to achieve these strategic goals.

Among the modern methods of cost management is the institution’s reliance on managerial accounting, which is a “diversified mix of inputs that can be measured by management for the purposes of management, planning and control, and are also used as an information system. This development was an inevitable result due to the development and spread of the ideas of the School of Management. Scientific that focused on the motto of what cannot be measured cannot be managed. (Alnoor & Michael , 2010, p. 10)

3. Work accidents (concept and conditions for its recognition)

Work accidents are very much related to industrial enterprises and institutions that are active in the public works sector due to the various dangers that surround the worker during the performance of his duties. A work accident is defined as injury

to which the worker is exposed, which leads to the disruption of the exerted activity and the consequent material and moral losses for the worker and the establishment alike.

It is also defined as any accident that occurs during the course of work, which leads to physical or mental harm, and includes cases of severe injury, or cases of intentional harm by other persons, which can be recognized medically.

It is considered a recognized work accident in the following cases:

- An accident that results in bodily harm, provided that it occurred at the place of work.
- The accident occurring within the distance the worker travels back and forth to work by the route connecting his place of residence and the place of work.
- Accident while on assignment.

The declaration of the work accident must be done as follows:

- Within 24 hours with the employer by the worker or one of his representatives.
- Within 48 hours, at the Social Security Authority by the user.

The work accident takes place "without prior expectation as a result of external causes or mistakes committed by the worker, resulting in damages to the worker or others, property and equipment ...etc, and therefore it is an unplanned or intended event by the worker, and according to Algerian law" a work accident is considered every An accident that occurs to the worker during the performance of his work or outside of it when performing a task according to the instructions of the employer, and bodily injuries resulting from a sudden and external cause, and it is also considered a work accident. Used, provided that the route has not been interrupted or deviated unless it is due to urgency or necessity or for compelling reasons, and the worker is considered insured from work accidents in the path that cuts him between his workplace and the place of residence, or the place where the

worker usually visits either to eat Or for family purposes, and all workers benefit from the Work Accidents Law, whether they are salaried employees or attached to the remuneration, regardless of the sector of activity to which they belong, as well as students and students who practice technical and vocational education. A specific fine is estimated at 20% of the injured's wage for three months, to be paid by the employer who is negligent with his obligation to the Social Security Agency. (Article12, 1983)

Accordingly, the work accident has necessitated the following conditions, which are "sudden, bodily harm, with constant reference to the element of violence and the external cause." (Belloula, 1993, p. 76)

3. Causes and variables of work accidents

Among the reasons that lead to work accidents in Algerian enterprises, according to various reports, we mention the following:

- The state of the physical work environment.
- Causes related to machinery and equipment.
- Causes related to the human resource itself.
- Experience: the worker who lacks real knowledge of the machine and the steps of its operation cannot predict in advance the probability of an accident.

4. Costs resulting from work accidents

Henry Savall classified the costs of work accidents into the following: (H.Savall, 1989, p. 151)

- costs resulting from the absence of the worker.
- Costs related to the injured worker's procedures (transportation, ambulance and administrative procedures ... etc).
- Costs of insufficient production.
- lost opportunity cost.

5. CASE STUDY INSTITUTION OF BCR SETIF

5.1. Brief introduction to the institution

The National Company for Mechanical Industries "SONACOME" was established according to Order No. 67-150 issued on August 09, 1967, which is considered as the parent company of the National Corporation for the Production of Screws, Knives and Faucets, and in 1973 the original Sonacom Corporation established a production unit in Ain El Kabira, State of Sétif. The date: July 06, 1973 is considered as the establishment of the branch, so that the contract will enter into force on: 06 September 1973 at a construction cost estimated at: 562 million Algerian dinars, and according to Decree No. 82/420 issued in the Official Gazette in its issue of 1838 dated: 04 December 1982 within the framework of Restructuring of Algerian enterprises Due to economic changes and the suffering of most enterprises from financial imbalances, the Ain El Kabira production unit has become a unit for the production of screws.

As for the actual establishment of the establishment, it was pursuant to Decree No. 08/83 of January 01, 1983, after the restructuring of the National Company for Mechanical Industries, SONACOM.

5.2. Assessment of costs resulting from work accidents using the S.O.F method at BCR

In assessing the costs resulting from work accidents, we have relied on the SOF method.

5.2.1. Social scale

Work accidents are among the most important reasons for the rise in total costs in the organization, due to the resulting social security costs and lack of production due to lost time, in addition to machine failure for a certain period, as well as loss of life and occupational diseases, so we will try to take a look General on work accidents at the national level to determine the extent of the damage they cause.

A - The reality of work accidents in the institution

To find out the justifications and causes of work accidents, we conducted a questionnaire to better know and diagnose the phenomenon. It included the workshop workers, who numbered 70 workers, and can be summarized according to the following table.

Table 1. shows the most important causes of work accidents

cause	number	ratio %
lack of training.	05	07.14
due to lack of regular maintenance.	28	40
lack of desire and motivation to work.	10	14.29
non-application of management instructions	06	08.57
not properly positioning the machines.	07	10
failure to apply security and safety	14	20
Total	70	100 %

Source: unpacking the questionnaire

Through the table it becomes clear to us that the lack of maintenance represents the most important causes of work accidents by 40%, as most institutions consider maintenance to be a cost for them, and if they carry out maintenance at long intervals, ignoring the importance of continuous periodic maintenance in providing professional safety and maintaining machines. In addition to the aging of most of the machines and exceeding their useful life, they are still in service, while from the accounting point of view they are completely obsolete, which calls

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for the institution to renew it to avoid the various problems that result from it.

B- Statistics of work accidents in the institution

According to the Foundation's documents, work accidents can be classified, Through the enterprise documents, we obtained the following statistics related to work accidents for various production workshops.

Table 2. number of work accidents according to the workshops

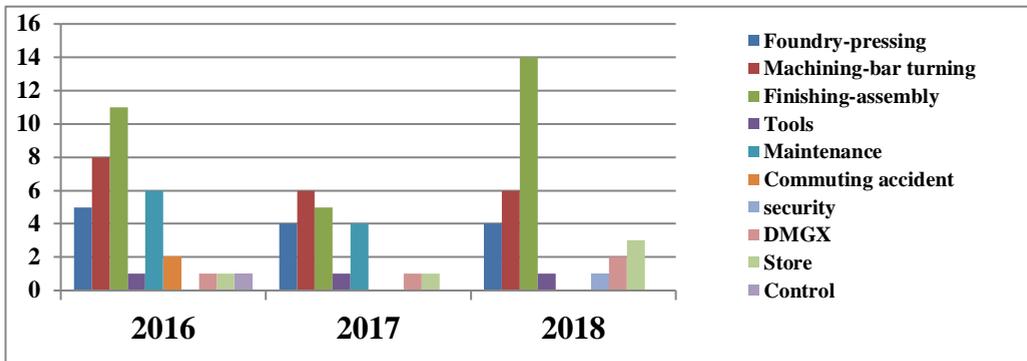
Workshops	2016	2017	change %	2018	change %
Foundry-pressing	05	04	- 20	04	- 20
Machining-bar turning	08	06	- 25	06	- 25
Finishing- assembly	11	05	- 54.54	14	27.27
Tools	01	01	00	01	00
Maintenance	06	04	- 33.33	00	- 100
Commuting accident	02	00	- 100	00	- 100
security	00	00	/	01	/
DMGX	00	01	/	02	/
Store	01	01	00	03	200
Control	01	00	- 100	00	- 100
total	35	22	- 37.14 %	31	- 8.57 %

Source: prepared by the researcher based on documents of Enterprise

Through the table, for more clarity, we can represent the statistics of the previous

table in the form of graphical columns through the following figure.

Fig.1. shows the number of work accidents by workshop



Source: prepared by the researcher based on the previous table

We note that the number of work accidents occurs largely in the Finishing-assembly workshop and this is due to the fact that all products pass through this workshop, which increases the likelihood of work accidents greater compared to other workshops, while we note that the total number of work accidents decreased in 2016 and increased again. Other year 2018.

5.2.2. Organizational Scale

in addition to the sensitivity operations procedures and the various instructions, the occupational safety and security official when work accidents occur prepares reports about work accidents, and every work accident according to the work accident reports is an industrial accident that causes injuries or deaths to workers, and this report includes the following:

First - general information: it includes the following:

- The name of the workshop in which the work accident occurred, and the date and time of the accident.
- The workforce, as the workers are divided into A.B.C.D groups.
- Name and title of the workshop official.

Second - Information related to the injured worker

It includes the following information:

- Name and surname, occupation, date of employment, harm to the injured worker.
- Downtime and damage to the machine.
- Accident classification (minor accident, medium accident, serious accident, very serious accident).

Third - work accident analysis: which includes the following:

- Description of the accident: it includes the date of the accident, the circumstances of its occurrence and a description of the injury in detail.
- Accident witnesses: It includes two witnesses to the accident.
- Reporting the accident: it includes informing the official with taking some measures, such as first aid.

Fourth - the effects of the accident

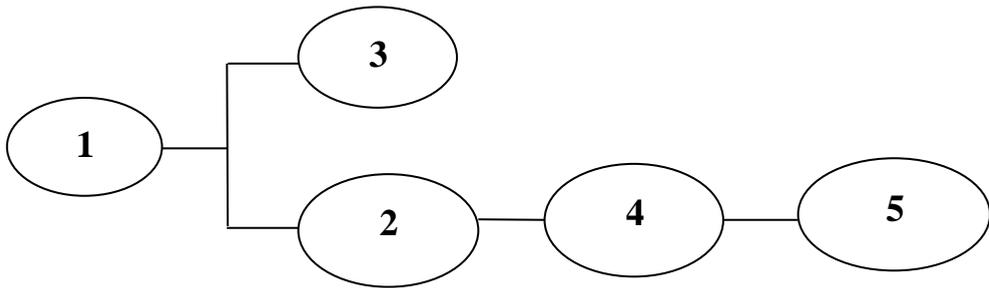
It includes clarifying the damages, and we will take the following example related to pouring acid that caused injury to the worker who works in a laboratory job, and we will explain the effects of the accident as follows:

- A wound and injury to the victim (burning the victim in the left forearm), and we code for it by the number (1).
- Pouring acid, and we denote it by number (2).
- The packaging is not suitable for this process, and we denote it by number (3).
- There is pressure inside the package, and we symbolize it by number (4).
- The laboratory is not protected by appropriate personal protective equipment, and we symbolize it by number (5).

Fifth - drawing the tree of the causes of the accident

It is used to explain the causes of the accident, in order, according to the following figure.

Fig.2. The reason tree shows the accident



Source: prepared by the researcher based on documents of Enterprise

six - Prevention measures

In order for such an accident not to happen again, the corporation must take into account the procedures that can be summarized as follows:

- Precautions and the necessity to use the appropriate means of work and pay attention and focus during work.
- Sensitizing workers, especially laboratory personnel, to the dangers associated with their work, especially chemical materials.
- The necessity to wear personal protective equipment.

5.2.3. Financial Scale

To calculate the cost of work accidents for the institution under study, we translate the various statistics and information obtained in the social and organizational scale, namely:

A- The cost of compensating lost days due to work accidents through overtime.

According to the information provided by the institution, the number of lost days due to work accidents is **205 days**, and the cost of additional hours was calculated as follows:

[Average Baseline Wage / (22 working days x 8 hours)] X The average cost of overtime hours.

From it: $[22500 \text{ DA} / (22 \text{ working days} \times 8 \text{ hours})] \times 175\%$

average cost of overtime hours = **223.72 DA**.

From this, the lost day compensation cost = the extra hour's cost \times the number of lost days

The cost of compensating lost days:

$223.72 \text{ DA} \times 205 \text{ days} \times 8 \text{ hours}$

The cost of compensating lost days = **366.900.80 DA**

B- The amount of social security contributions to be borne by the institution

It is estimated at 26% of the cost of lost days, and based on previous data, we find:

$366.900.80 \text{ DA} \times 26\%$

social security contributions to be borne by the institution = **95.394.21 DA**

C- Expenses of transportation and aid for injured workers

According to the information provided, these expenses are estimated annually at **270,000,00 DA**.

D- The lost opportunity cost due to reduced production quantity

According to the information provided by the establishment, the production time of one unit = **0.156 hours**

Lack of production quantity = number of hours of absence due to work accidents / time of production per unit

Decreased production quantity = $(205 \text{ days} \times 8 \text{ hours}) / 0.156$

Decreased production quantity = **10.512.82 finished units**

Lost opportunity cost = Quantity of production lost \times Unitary profit margin

The lost opportunity cost = $10.512.82 \text{ finished units} \times 182.81 \text{ DA}$

The lost opportunity cost = **1.921.848.62 DA**

From the above, the previous costs can be summarized in the following table.

Table 3. Calculation of costs resulting from work accidents using the S.O.F method.

Cost elements	Amount DA
Compensation for lost days due to work accidents	366.900,80
The amount of social security	95.394,21
Transportation and ambulance expenses for workers	270.000,00
The opportunity cost of lost production	1.921.848,62
Total costs resulting from work accidents	63,2.654.143

Source: prepared by the researcher based on documents of Enterprise

6. ANALYZE THE RESULTS

results in costs related to the financial aspect that the organization bears, which weakens its competitive advantage, which are mainly the expenses of raw materials lost due to work accidents, financial expenses when investigating the accident and the procedures for transporting the injured from the scene of the accident, in addition to expenses related to the compensation provided to the worker and borne by the institution, As well as the costs of maintaining the machines and the decrease in the quantity of production, as mentioned earlier. From the above, we assessed the costs resulting from work accidents using the SOF method, which is characterized by accuracy and comprehensiveness, and we came to know the impact of work accidents on the performance of the organization from multiple aspects, especially the increase in total costs by **2,654,143,63 DA**, in addition to the lack of profitability and competitiveness of the institution and this confirms The first hypothesis is correct.

By applying the S.O.F method to assessing the costs resulting from work accidents, we observed the various elements that depend on them in contrast to the traditional methods that have proven their inability and lack of scientific and accurate evaluation, and this confirms the validity of the second hypothesis. The outputs of the results obtained using the S.O.F method are considered as inputs to the management accounting that the organization relies on in the strategic management of the cost in order to know its causes and work to reduce it, and thus help the quality of decision-making in the organization, and this confirms the validity of the third hypothesis.

The S.O.F method allowed analyzing the elements from different angles by knowing the causes of work accidents in a scientific, sequential manner, which helps the organization to avoid them in the future, and what results in them greatly reducing costs, which improves the competitiveness of the institution and increases its profitability, and this confirms the validity of the fourth hypothesis. As Taiichi Ohno, a Toyota production system designer with the saying "The goal is to reduce costs says "that we often use the word "efficiency" when talking about production, support and business, but in the modern world "efficiency" means reducing costs including costs resulting from work accidents. .

7. CONCLUSION

There are many methods of evaluating costs related to work accidents, but many of them are traditional and are not characterized by accuracy and comprehensiveness in the analysis, which means reaching inaccurate results, as they do not help to define responsibilities and do not show the cost of the missed opportunity, and therefore the decision-making is inappropriate in most cases and through experiments proven method SOF is one of the best and most reliable methods, and through this study we came to draw the following conclusions:

➤ The human factor is considered the main cause of work accidents, due to the

characteristics of the inappropriate work environment on the one hand, and on the other hand the negative mentalities that most workers enjoy in most institutions, especially public ones.

- There is an inverse relationship between work conditions and work accidents by increasing the employee's job satisfaction, which leads to focus and alertness during work, and thus work accidents are reduced to the lowest possible level.
- The S.O.F method is the most appropriate and best way to evaluate costs resulting from work accidents, and thus facilitate the organization to know the size of the real costs and help it take appropriate measures.
- The costs of work accidents affect the profitability and competitiveness of the organization significantly, and therefore the organization must know their causes and work to address them from the beginning.

some recommendations can be given that we deem appropriate, namely:

- The necessity to apply the S.O.F method in various institutions, because of its credibility, comprehensiveness and great accuracy in the process of evaluating costs resulting from work accidents.
- Knowing the causes of work accidents and the need to provide safety means and improve the work environment.
- Assigning the worker according to his capabilities and skills while monitoring his behavior.
- The necessity to carry out continuous maintenance of machines to maintain productivity and provide occupational safety conditions.
- The necessity of training workers on how to use machines and obligating them to apply safety and security instructions.

Benefit from the expertise and experiences of other institutions that are characterized by a few work accidents.

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