XLVIII INTERNATIONAL SCIENTIFIC CONFERENCE ON INFORMATION, COMMUNICATION AND ENERGY SYSTEMS AND TECHNOLOGIES

iCEST 2013

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26 - 29 June 2013, Ohrid, Macedonia

Proceedings of Papers

VOLUME 1

Bitola, 2013

XLVIII INTERNATIONAL SCIENTIFIC CONFERENCE ON INFORMATION, COMMUNICATION AND ENERGY SYSTEMS AND TECHNOLOGIES

- ICEST 2013 -

Proceedings of Papers – Volume 1 of 2 volumes

Editor: **Prof.Dr. Cvetko Mitrovski**

Technical Editor: **Jove Pargovski**

Published by: **Faculty of Technical Sciences – Bitola**

Printed by: **OFFICE 1 – BITOLA**

Print run: **50**

ISBN: **978-9989-786-90-7**

CIP - Каталогизација во публикација
Национална и универзитетска библиотека "Св. Климент Охридски", Скопје

004(062)
620.9(062)
621.3(062)

XLV International Scientific Conference on Information,
Communication and Energy Systems and Technologies (45 ; 2010 ; Ohrid)
ICEST 2013 : proceedings of papers / XLVIII International
Scientific Conference on information, communication and energy
systems and technologies, 26-29 Juni, Ohrid, Macedonia ; [editor
Cvetko Mitrovski]. - Bitola : Faculty of Technical Sciences, 2013. -
2 св. (862 стр.) : илустр. ; 30 см

Фусноти кон текстот. - Библиографија кон трудовите. - Регистри

ISBN 978-9989-786-90-7 (вол. И)
ISBN 978-9989-786-89-1 (вол. ИИ)
1. Mitrovski, Cvetko [уредник]
а) Информатика - Собири б) Енергетика - Собири в) Електротехника -
Собири
COBISS.MK-ID 94746890

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Analyzing the number and the nature of the injuries in a industrial system from Bitola, R. Macedonia

Ivo Kuzmanov[1], Silvana Angelevska[2] and Zore Angelevski[3]

Abstract – **During the year 2012, a research as a part of the every year activity of the NGO Bitola from Bitola (health and safety organization), considering the number and the nature of the injuries was conducted in Bitola's region. The research was done taking into consideration every single enterprise in Bitola's region (considering the nature and the number of the injuries), and considering the documents from the local inspectors (safety and health). All of the information's gathered were separated in several categories. This paper represents the analysis from FOD Bitola – a local business entity. The analysis was conducted in a frame period January – December 2012, and documents from local safety inspectors were also considered.**

Keywords – **Safety at work places, Work injuries, Safety systems.**

I. INTRODUCTION

Safety on the work places is one of the key aspects that directly lead to motivated staff members, whose feelings as safer as can be in their workplaces, leads directly to maximum motivation and achievement on the defined business objectives. [1] Considering Bitola's region there are numerous enterprises with a total amount of more than 13.000 employees. So the injuries spotted in these enterprises are one of the main aspects for several institutions such as: the local safety inspectors, the NGO Bitola (local safety and health organization), Macedonian labor ministry, etc.

Considering the main activities of the NGO Bitola, where we are active members, the main objective of the association is to educate the enterprises in the field of safety and health on work places, to analyses the number and the nature of the injuries in the Bitola's region on annual base and to have continued efforts in terms of educational and practical advices to business enterprises in the field of occupational safety and health.

The sources that were used to get the relevant information's for these analyses are [2]:

- Submitted evidential sheets given by the business enterprises that gravitates in the Bitola's region
- Submitted records for the number of injuries, given by competent inspectors (safety and health on work places) from Bitola's region.

The basic aim of this paper is to represent all of the injuries spotted in a real business entity in Bitola's region, guttered in the time frame January – December 2012. All of the information's are analyzed in the period January – March 2013, and are divided in several sub – categories (key points of view) represented in addition of this paper.

II. PRESENTING THE BUSINESS ENTITY AND THE CRITERIA'S THAT WERE UNDER RESEARCH

The business entity that is represented in this paper is FOD Bitola. It is an industrial system from the steel - manufacturing industry, which is active from 1986. At the moment there are 220 full time employees, and several from agencies for temporarily employment. [3] The targets of the research are the 220 employees because all of the records are for them. In the business entity there is a double shift work period (2 shifts / 16 hours total).

All of the results from the conducted research, considering the work injuries on the direct work places, are analyzed and categorized in several key points of view such as [1], [2]:

- the gender of the injured person
- the aimed education of the injured person
- the nature of the injury (death, heavy, light, etc)
- the body part that is injured
- the day of the week (when the injury is spotted)
- the time frame of the day
- the age of the injured person
- the cause of the injury, and
- lost work days (as a result of the spotted injury).

Considering the two sources for information (information from the entity, and information from the local inspectors), I must say that there are 26 spotted and confirmed (by the local inspectors) injuries in the time frame January – December 2012.

In addition of the paper, several of the key points of view, with the final results, are represented.

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III. Presenting the results from the research

A. *Gender of the injured persons*

Considering the gender of the injured persons the situation is represented into table 1, and in the figure 1.

Table I
GENDER OF THE INJURED PERSON

Gender	Total number of injured persons	In percent (%)
Male	18	69.2
Female	8	30.8
TOTAL	26	100

Fig. 1. Gender of the injured person

Viewing the results, another sub – criteria is more than relevant, and that is the total percent of injured persons in 2012, considering the total number of employees (220 employees). So dividing the number of injured persons (26) with the total number of employees (220), the total percent of injured persons is 11.8%. That means that every 10-th person in this business entity was injured during the work activities in 2012.

B. *Nature of the injury*

Considering the nature of the injury, all of the injuries were divided into three main categories, such as: death, heavy injury and light injury. Unfortunately all of the injuries (26) were heavy injuries, so the total amount of lost work days as a result of the injury in 2012, were 283 work days. From that amount, 276 work days were directly lost as a result of a spotted injury, and 7 work days were lost as a result of an professional illness.

Furthermore, considering the body part that was injured, there are several main categories of injuries, such as:

- Injury of the head
- Injury of the body
- Injury of the arm
- Injury of the leg

Taking in consideration that the number of the injured persons in FOD Bitola, in the year 2012 was 26 injured persons, before I start the presentation of the results divided in the categories previously mentioned, I must say that several persons (to be more precise – 5 persons), have had multiple injury (for example 1 injury – 2 body parts injured). That is the reason why the total number of injuries in Table 2 and in Figure 2 is 31.

The table 2 and figure 2, are created especially for representation of the results

Table II
THE BODY PART THAT IS INJURED

Body part	Total number of injuries	In percent (%)
Head	2	6.4
Body	2	6.4
Arm	14	45.1
Leg	13	42.1
TOTAL	31	100

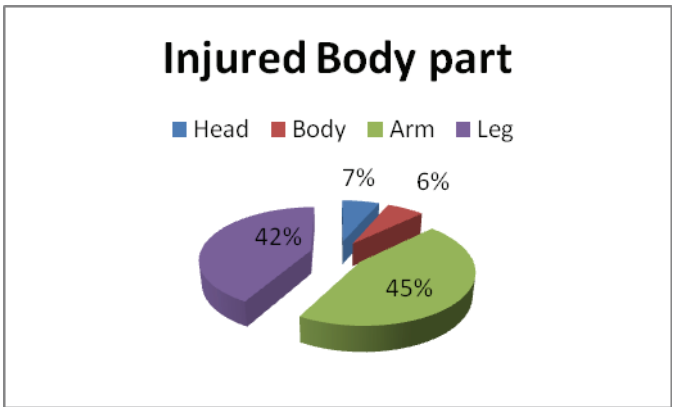

Fig. 2. Injured body part

Seeing the results, arms and legs are the most injured body part. Taking into consideration that the number of injured persons was 26 injured people, every 9-th of 10 people has an injury of the arms or the legs. On the other hand 87% of the body injuries are injuries of the arms and the legs. So, this is one of the main objectives for further analysis, and future steps for safer work places.

C. *Aimed education of the injured person*

Considering the work processes and the level of education that is required for the work position from one hand, and on the other the results from the conducted research and the results about the level of the education aimed, we can conclude that every 26 people has an middle level of education, or in world frame known as secondary school (classification in Macedonia - SSS). But, I must say that the business entity has multiple processes that require this level of

degree and that is the main reason why all of the spotted injuries, to be more precise 26 people, has a middle level degree (secondary school). In all of the business entities that were under consideration during this research the results from these criteria were segmented in several levels such as: primary school, secondary school, university degree, master degree and even a PhD degree.

D. Day of the week (when the injury is spotted)

The results from the research were considered from another criterion, and that is the day of the week when the injury is spotted. Considering the processes of production, the business entity work from Monday to Sunday, with shifts. So, all of the spotted injuries considering this criteria, are represented into Table 3 and Figure 3 in addition.

Table III
DAY OF THE WEEK

Day	Total number of injuries	In percent (%)
Monday	2	7.7
Tuesday	5	19.2
Wednesday	5	19.2
Thursday	7	27.0
Friday	5	19.2
Saturday	0	0.0
Sunday	2	7.7
TOTAL	26	100

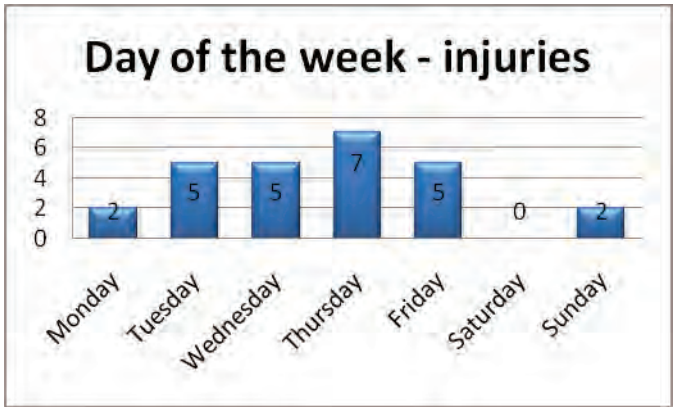

Fig. 3. Injuries in week day

Seeing the results represented in table 3 and figure 3, it is more than obvious that most of the injuries, or to be more precise 22 from 26 total (84.6%) has been spotted in the week frame Tuesday-Friday. But the so-called black day is Thursday with total 7 injuries (or 27%). We can say that every 4-th person from 26 (spotted injured persons) is injured in Thursday.

E. Age of the injured person

The age of the injured person is another very relevant factor for injury. Considering numerous foreign authors, at the beginning (when the employee doesn't have any kind of experience) and in the period when the employees are before retirement (60-65 years of age), the risk factor for injury is up to 80-85%. That is why the age of the workers is one of the elements that should be considered during the process of risk evaluation on direct work places.

On the other hand the results from the conducted research are separated in 4 different categories of age, such as:

- 18-25 years of age
- 25-35 years of age
- 35-45 years of age
- 45-65 years of age

The frames 18-64 years of age are taken because of the Macedonian laws. 18 years is considered as an age when persons can start working, and the age of 65 is the age when the person is going to retirement.

All of the results from the research on this point of view are represented in Table 4 and Figure 4 in addition of the paper.

Table IV
AGE OF THE INJURED PERSON

Age	Total number of injuries	In percent (%)
18-25	0	
25-35	3	
35-45	6	
45-65	17	
TOTAL	26	100

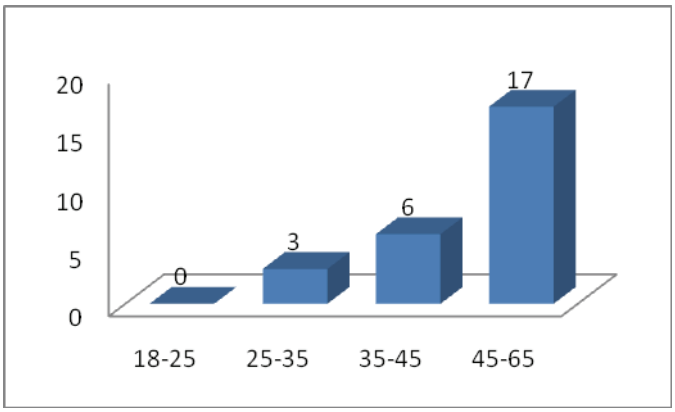

Fig. 4. Age of the injured person

Seeing the results from these criteria, there are with a core lance with the theoretical views of numerous foreign authors. Most of the injuries, to be more precise 17 out of total 26 (65.4%) are in the age where employees are more and more experience and several of them are before retirement (age 45-65). There are several factors for this situation, but among them I must say that the situation where employees consider that they know everything and they couldn't be injured

because they know the process is the main criteria for this kind of situation. Several steps could be taken with a final aim to reduce the number of injuries, but the main one is to have an open conservation with this category of employees (45-65), where several case-studies could be represented in a aim to reduce the injuries and to make them thing more and more that they can be also injured during every day work activities. This is also the work of the safety and health officers.

F. Cause/nature of the injury

Considering all of the above mentioned key points of view, the last but not the least is the cause of the injury. Considering the causes for injury they can be divided in several categories such as:

- Mechanical nature
- Chemical nature
- Electrical nature
- Equipment for personal safety
- Other

Seeing the categories, and regarding the processes of work, most of the spotted injuries are with mechanical nature (24 out of 26), and 2 from the category equipment for personal safety. In addition in table 5 and figure 5 it is given an illustrative view of this key point of view.

Table V
CAUSE FOR THE INJURY

Nature of the cause	Total number of injuries	In percent (%)
Mechanical	24	92.3
Chemical	0	0.0
Electrical	0	0.0
Equipment for personal safety	2	7.7
Other	0	0.0
TOTAL	26	100

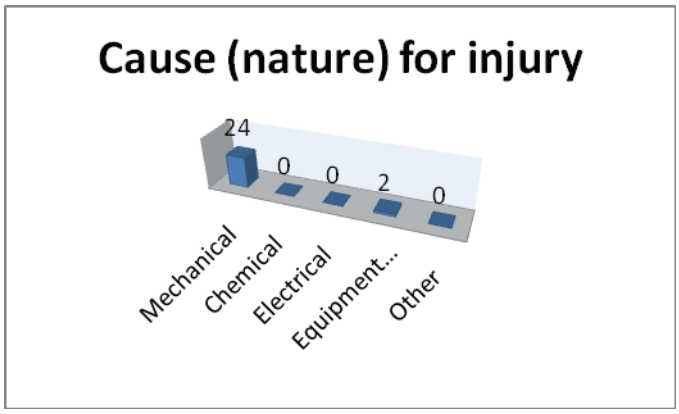

Fig. 5. Cause (nature) for injury

Seeing the results from the analysis of the key point – cause for the injury, the conclusion is that all of the injuries are as a result of lack of attention or lack of equipment for safety on direct work places. This is a situation for further analysis, but that will be presented in a different paper.

IV. CONCLUSIONS

Taking in consideration the information that is presented in this paper, as well as extensive analysis by category, the same one it is an excellent basis for taking preventive actions (primarily by the company, but also by the competent inspectorate), with the final aim of reducing the number of injured people. Considering the nature of the NGO Bitola (occupational and safety), the situation will be followed in 2013, after which actually at the end of this year (according to the number of recorded injuries) could be concluded whether any kind of actions, in aim to reduce the number of injuries, in this business entity were made.

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