

**UKRAINIAN JOURNAL  
OF FOOD SCIENCE**

**Volume 1, Issue 1  
2013**

[WWW.NUFT.EDU.UA](http://WWW.NUFT.EDU.UA)

## Contents

Preface.....	6
<i>Galina Polischuk, Sergii Ivanov, Tetiana Krupska, Volodimir Turov</i>	
Ice cream phase composition study using low temperature <sup>1</sup> H NMR spectroscopy.....	6
<i>Maksym Polumbryk, Sergiy Ivanov, Oleg Polumbryk</i>	
Antioxidants in food systems. Mechanism of action.....	14
<i>Olga Rybak</i>	
Some aspects of the formation of emulsions and foams in food industry.....	40
<i>Olga Evtushenko, Igor Klepikov</i>	
Exploration of occupational injuries in food industry of Ukraine.....	49
<i>Elena Deriy, Svitlana Litvynchuk, Anatolii Meletev, Volodymyr Nosenko</i>	
Refinement of the physical and chemical methods for the determination of sugars.....	56
<i>Tetiana Silchuk, Anna Kovalenko</i>	
Rye-wheat bread production at the restaurants.....	61
<i>Oleksandr Shevchenko, Romaniuk Artem, Volodimir Piddubniy</i>	
Features and benefits analysis of transient processes in food technology.....	67
<i>Volodimir Piddubniy, Mykola Sova, Oleksandr Shevchenko</i>	
Assessment of prospects using the latest technology stabilization of beverage.....	73
<i>Marina Bilko, Alina Tenetka</i>	
The regulation doses of sulfur dioxide with the aid of preparations, based on glutathione of yeasts in the production of pink table wine.....	77
<i>Svitlana Litvynchuk, Inna Hutsalo, Tamara Nosenko, Volodymyr Nosenko</i>	
Using of infrared reflectance spectra of sunflower meal for determination its moisture content.....	83
<i>Volodimir Shesterenko, Irina Sydorчук</i>	
Research of the features of reactive power compensation in the combined system of food industry.....	89
<i>Tetiana Kalinovska, Vira Obolkina</i>	
Substantiation of using wine-making secondary products as alternative raw material for confectionery industry.....	96
<i>Irina Babich</i>	
The influence of technological treatments on physical and chemical structure of wine.....	100
<i>Irina Khamutovska</i>	
Attraction of foreign investment to Ukraine: problems and solutions.....	100
<i>Victor Dotsenko, Oksana Arpul, Natalia Bondar, Tetiana Iemchuk, Olena Dudkina</i>	
The development of the restaurants' chain in the capital region of Ukraine.....	100
<i>Sergiy Samiylenko, Sergiy Vasylenko, Vitaliy Shutyuk</i>	
Entropy analysis of heat exchanging appliances.....	100
Abstracts.....	126
Instructions for Authors.....	140

# Exploration of occupational injuries in food industry of Ukraine

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## **Keywords:**

Occupational injury  
Accident  
Frequency of injury  
Artial loss  
Capacity  
Injury heaviness  
Sort of events  
Accident reason

## **Article history:**

Received 13.01.2013  
Received in revised form  
21.02.2013  
Accepted 22.03.2013

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## **ABSTRACT**

The aim of this work is carrying out of statistical analysis of occupational injuries among Food Industry employees. The object of research is occupational injury in Food Industry for 2003-2011 period.

Status of occupational injury in Ukraine was analyzed for 2003-2011 period.

We show a results of occupational injury dynamic research in Food Industry of Ukraine from 2003 to 2011 years. Distribution for male and female injured employees on enterprises of Food Industry was performed. Indexes of injury rate and heaviness were calculated. And finally, distribution of accidents for main reasons, sorts of events, profession group, age, work experience was performed.

Exploration of labor safety conditions and also of occupational injury reasons and circumstances is useful for developing of sound and effective ways for prevent and reduce the occupational injury, illnesses and worker's traumatism.

## **Introduction**

The main problem of labor safety is occupational injuries and professional illness. This problem is caused by differences between human desire to total safety and facilities of science, technology and manufacture resources. That's why for reduce the occupational injury and illness there's one thing important now and will be always - a choice. The choice between efficiency and manufacture safety, between cheep and more expensive prevention measures, between full attention to labor safety needs what is necessary and resource limits.

Exploration of labor safety conditions and also of occupational injury reasons and circumstances is useful for developing of sound and effective ways for prevent and reduce the occupational injury, illnesses and worker's traumatism.

In case of topic actual is solving of scientific problem that consist in exploration of reasons and accident sorts that leads to injuries of food industry workers. Reasoned measures for occupational injury prevention are also important and can provide effective prophylactic in general and accompanies social and economic positive effect through the reducing of occupational injury level.

The aim of this work is to make a statistical analysis of occupational injury among employees of Food Industry.

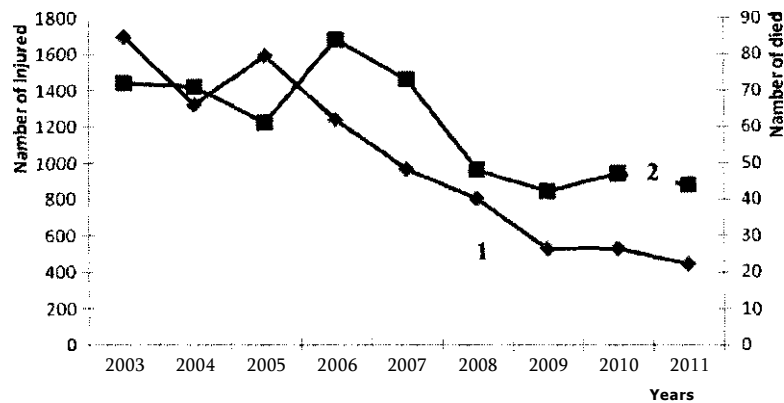
The object of research is occupational traumatism in Food Industry for 2003-2011 years.

## Material and methods

One of the methods of occupational injury research is the statistical method. It gives the opportunity to find out quantitative side of traumatism and also explore his basic reasons and patterns of action by large number of factors. Data for analysis was taken from the H-1 form. This is a standard act investigating accidents that occurred with great-employees during labor (official) duties, including assignments in accordance with the Regulations on the investigation and management accounting cases accidents, occupational diseases and accidents at work [Procedure of investigation and accounting of accidents, professional diseases and work accidents. -K. : Osнова, 2004. - 104 p. Podobed I.M. Prediction of occupational injuries in agricultural economic sector of Ukraine: Dissertation abstract of technical sciences candidate: 05.26.01/ State Committee of industry safety, labor protection and mining observation. - K., 2008. -20 p.].

## Results and discussions

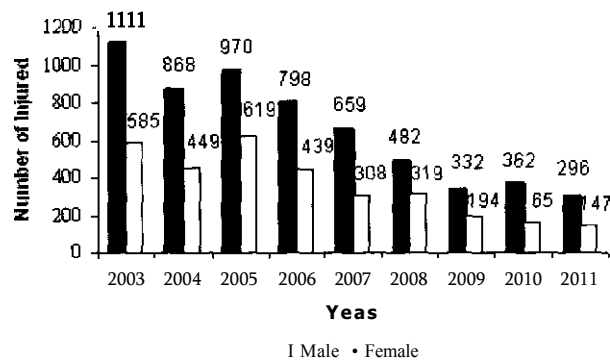
The analyses of occupational injury level in Ukraine, shows that the food industry is one of five most dangerous economic branches [Evtushenko O.V. Analysis of occupational injury statistic in Food Industry of Ukraine. Food Industry].



**Fig. 1. Dynamic of occupational injury in food industry of Ukraine, 2003-2011 period**  
*1-injured; 2-injured lethally*

The analysis of literary sources, shows that 9,1 thousands of person were injured in food industry only for 2003-2011 years. Since 2003, in the food industry more than 541 employees had died (fig. 1). [Koshil O.G. Statistical bulletin. Accidents at workplace in 2002 - 2011 / Koshil O.G., Kostrovenco L.N. -K. : State Statistic Committee of Ukraine, 2003 - 2011].

According to the State Statistic Committee of Ukraine, from 2003 to 2011 in food industry was injured nearly 9,1 thousands of employee. Where 64,6% of injured are male and 35,4% are female workers, that in two times less than male injured level (fig. 2).



**Fig. 2. Dynamic of injured male and female workers in food industry of Ukraine, 2003-2011 period**

While 2003-2011 years, in food industry number of injured with loss of work capacity on 1 and more working days and with lethal consequences has been decreased from 3,7 to 1,2 per 1000 employees [Koshil O.G. Statistical bulletin. Accidents at workplace in 2002 - 2011 / Koshil O.G., Kostrovenko L.N. - K. : State Statistic Committee of Ukraine, 2003 - 2011]. In the same time, the number of inoperability man-days in whole Ukraine increased from 29,7 to 47,0 per one injured. In food industry, this index increased form 26,3 to 47,2 according to same period (fig. 3).



**Fig. 3. Comparative growth dynamic of inoperability man-days per one injured at work in food industry of Ukraine, 2003-2011 period**

As we see, on a table 1, the frequency of injury coefficient and the partial loss of working capacity coefficient are repeating the tendency of total accidents number decreasing in food industry of Ukraine. In 2011, the frequency of injury coefficient was in 3 times less, than in 2003 and was amounted 1,2 against to 3,7. While, the partial loss of working capacity coefficient in 2011 decreased in 5 times as compared with 2003, that made 47,2 against 26,3.

The main accounting figures of injury now are values combinations of rate and heaviness, they showed in table 1.

**Table 1. Estimates of occupational injuries in Food Industry of Ukraine, 2003—2011**

**Occupational** **Years**

injuries indexes	2003	2004	2005	2006	2007	2008	2009	2010	2011
Frequency of injury coefficient $c_f$	3,7	2,8	3,4	2,7	2,1	1,9	1,4	1,4	1,2
Partial loss of working capacity coefficient $C_{pwc}$	0,191	0,069	0,159	0,052	0,057	0,038	0,037	0,044	0,036
Injury heaviness coefficient $C_{ih}$	26,3	28,1	29,7	29,4	33,6	36,8	38,8	39,1	47,2
Relative coefficient of mortality $C_m$	1,3	1,6	1,2	2	2,3	1,8	2,4	2,7	2,6

The analysis of statistical data shows that the lethal accidents with dead of employee are: transport accident (34,6%), falling of injured (17,5%), in that number falling from the height (10,2%), influence of outfit and details that move, fly and spinning (11,6%) and falling, collapse of materials, rocks, soils etc. (9,5%) (table 2).

Analysis of injury reasons allows us to make the conclusion that the main reasons of injury among Food Industry workers are: breach of labor and production discipline (16,2%), traffic infraction (16,2%), drawbacks in study of labor rules (12,9%).

Technical reasons of injury also have a big importance. They appears in cause of construction drawbacks, limitation of capital goods quality (5,4%), discrepancy of technological process safety requirements (4,2%), unsatisfactory technical status of industrial objects, buildings, constructions, territory, capital goods and transport (9,6%).

Above 66% of deadly injured employees in Food Industry belong to the next groups of professions: drivers (26,3%), low-skilled employees (17%), operators (11,6%) and locksmiths (11,3%).

Dividing of deadly injured employees of Food Industry by the age in 2003-2011 years showed on picture 3 and dividing by the professional experience is showed in. We can see that above 30% of deadly injured employees are 40-50 years old. And above 25% of injured was 30-40 years old. Thus, dead of age 30-50 years old are 57% from all deadly injured in this branch. It means that most of Food Industry employees are from this age category. Big number of injured workers with service record over the 20 years (51,3%) had injured cause of "accustom to danger". This is the psychophysical reason of safety rules violation. Big number among dead employees with low professional experience: less than year 30% and less than 3 years above 23%. It can indicates that professional training of employees is failed and inexperienced workers have a low control in Food Industry enterprises.

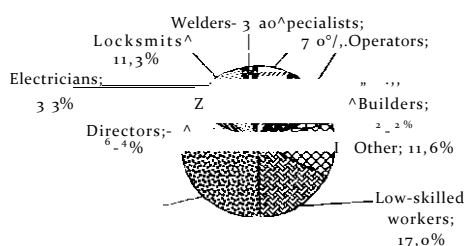
Analysis shows us that 30% of dead workers in Food Industry are not educated by the profession or kind of work, that causes accident. Besides, 11-13% of injured wasn't instructed with entrance or second instructions.

Analysis data shows that from all deadly injured workers those who educated by profession of type of work above 37% got injury during six month after training. From all injured who pass the workplace training over 80% had died during 3 month after training. This facts suggests about drawbacks in professional training of branch workers and defective implementation of instructing in Food Industry enterprises.

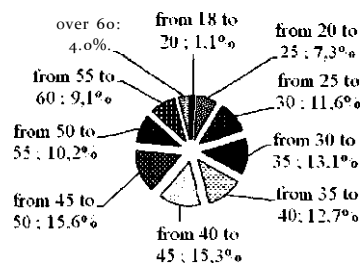
**Table 2. Dividing of dead by the accidents of occupational injury in Food Industry in 2000-2011**

Types of accidents	Percent
Transport accidents	34,6

Falling of injured	17,5
<i>Including the:</i>	
Falling from height	10,2
Falling during the move	3,6
Falling, collapse, ruing of objects, materials and other	9,5
Influence of outfit and details that move	11,6
<i>Including the:</i>	
influence of outfit and details that move, fly and spinning	7,3
Electric Shock	5,5
<i>Including the:</i>	
Touch to the power line and broken wires	1,8
Extreme temperature effects (except fire)	2,9
Effect of hazardous and toxic substances	4,4
Drowning	0,4
Asphyxia	1,8
Murder or injury caused by another person	1,8
Natural disaster	0,4
Fire	2,5
Explosion	3,6
Other types	3,5



**Fig. 4. Dividing of deadly injured employees of Food Industry by the profession groups in 2003-2011**



**Fig. 5. Dividing of deadly injured workers of Food Industry by the age in 2003-2011**

21% of deadly injured workers in Food Industry during the accident was in alcohol intoxication condition what means the low discipline on branch enterprises. Analysis shows that in 48% of cases the injured has violated the labor protection law and another person violated law at 77% of cases. Above a half of accidents was caused by a different level directors who violated the labor protection law. Meanwhile, the part of injured directors amounts slightly more than 6%.

**Table 3. Dividing of dead by the reasons of occupational injury in Food Industry for 2000-2011**

Accident reason	Percent
<i>Technical</i>	

Constructive drawbacks, imperfection, low reliability of capital goods	5,4
Constructive drawbacks, Imperfection, low reliability of transport	0,3
Low quality of development or absence of the project documentation for construction, reconstruction of production objects, buildings, etc.	2,7
Imperfection, mismatch between the security requirements of technological process	4,2
Poor technical condition of production facilities, buildings, structures, territory	3,9
Poor condition of the capital goods	3,3
Poor condition of the transport	2,4
Poor condition of the working environment	0,3
<b>Organizational</b>	
Unsatisfactory functioning or absence of labor protection system	5,4
Drawbacks during study of working safety methods	12,9
Unsatisfactory of creating, imperfection or absence of labor protection instructions	0,6
Absence of labor protection duties in job instructions	0,6
Violation of work and rest regime	0,9
Absence or poorly medical survey (professional selection)	0,9
Unused personal protection in feet of its' absence	1,2
Work with switched off, broken collective protection devices, alarm systems, ventilation	1,2
Using of workers with another profession	0,3
Violation of technological process	1,2
Safety violation during the operation of machines, mechanisms etc.	4,5
Violation of safety rules during the transport using	3,6
Traffic infraction	16,2
Disuse of personal protection (if you have it)	3,6
Disuse of collective protection	0,3
Violation of labor and production discipline	16,8
<b>Psychophysical</b>	
Alcohol, drug, toxic intoxication	3
Poor physical and health	0,3
Injury as a result of wrongful act of another person	1,2
Other reasons	2,8

**Table 4. Splitting of specific weight of dead workers by the experience in Food Industry for 2000-2011 period**

Years range	Work experience, years	
	Total	By profession
Less than 1 year	4,4	29,8
From 1 to 3	3,6	23,6
From 3 to 5	3,6	7,6
From 5 to 10	10,2	12
From 10 to 15	12,7	10,2
From 15 to 20	14,2	6,2
Over 20	51,3	10,5

## Conclusions

The results of research shows, that in food industry of Ukraine during 2003-2011 the number of work accidents was decreased almost in 4 times.

Big part of injuries accounted for experience workers who have service record over than 20 years and for workers with professional experience less than one year. We should to pay special attention during the primary and second instructing on the workplace. Besides, it is



necessary to improve quality of instructing, intensify the control for low-skilled workers. It is necessary to enlarge the responsibility of all level directors on branch enterprises with aim to prevent the labor safety law violation which leads to work accidents.

The frequency of injuries decreased, but the severity of injuries is still high. That means, the accidents became more dangerous. Average frequency of injuries Cf amounts 2.3 and severity of injuries index Cih amounts 34.3 - both of them for period from 2003 to 2011. It indicates that, despite decline of total number of accidents in food industry, the severity of injuries is increasing and it's necessary to take crucial and complex measures for reduce these rates.

Lately modern manufacture work in course international law of labor safety, where for rationale of prevention measures usually using a results of injury risk analysis. Choosing and reasoning of occupational injury prevention ways and measures is provided with consideration of risk factor.

That's why the next important step of exploration is developing of effective prophylactic measures for occupational injury prevention by definition of influence pattern on accidents which caused by technical, organizational, social, economic and manufacture reasons.

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