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Risk Analysis by Fine Kinney Method in a Laboratory

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Abstract

In this study, a risk assessment was performed by Fine-Kinney method in various units of an official institutional laboratory. For this purpose, feasibility of the laboratory determinated, devices and areas with high risk priority were identified. In hazardous areas, High-risk materials such as store chemical material, spare part production, molding and pressing, rubber production and shredding, plastic breaking, deburring, cutting and packaging, plastic injection molding machines used. The risks identified in these units can be stated as follows; injury by exposure to chemical materials, diarthrosis and spinal cord injury, limb loss, hearing loss, etc. In these units, the risk assessment was carried out by the Fine Kinney method and necessary precautions were taken and necessary arrangements were made. These measures are applying the control protocol for routine execution of the process, training of personnel for each unit according to ISG rules and giving training seminars at regular intervals, protective clothing and equipment used during operation, regular maintenance and repairs of units. After these precautions, "risk acceptable" values are obtained by carrying out risk preventive activities in regions with the highest risk.

Key Words: Fine Kinney Method, risk analysis, laboratory.

1. Introduction

As a result of the researches of international organizations around the world, it is understood that there is a relationship between occupational safety and labour productivity and that productivity is high in safe workplaces. In addition, workplace accidents and occupational diseases in safe workplaces are at a very low level. Establishing a safe environment at work depends on risk management. For risk management, occupational health and safety training is required.

Occupational health and safety risk management aims to gather the most valid and accurate information about the causes and factors that constitute occupational diseases and to establish an effective Safety Network in order to prevent the emergence of invisible hazards. For this purpose, necessary risk analyzes are applied. Faced with a risk, the first thing that needs to be done to produce the event and by determining the effects of the risk source of risk identify the risks and take precautions against those risks.

Risk management is a systematic in which risks are identified, which risks are prioritised, and strategies and plans are developed and implemented to prevent risks. There are various methods for risk management. In this study, Fine Kinney Method was used for these methods. (1-4)

1.1 Fine-Kinney Method

The "Mathematical Evaluations for Controlling Hazards" method developed by W. T. Fine has been revised by Kinney and Wiruth in 1976 and updated with the name "Practical Risk Analysis for Safety Management". This method is now known and applied as the Fine-Kinney method. The fine-kinney method is one of the methods used to classify risks. This method helps us calculate the priority order of the measure to be taken. It helps us transfer auxiliary resources to the most important unit by priority order. Risks in this method are; probability, frequency and intensity ratios are calculated and classified. According to these calculations, priority is given to the measures. The method helps the system take better quality measures in risk analysis by providing realistic outputs with data analysis of the workplace. (3-7)

2. METHOD

In this study, a fine-kinney method was used in risk assessment analysis in a laboratory. According to this method, the calculation method is given below. (3-7)

Risk value= İ x F x D
İ= probability, (0,2-10)
F=frequency, (0,5-10)
D=severity

Table 2.1 Probability Scale (6)

Value	Category
0,2	**impossible**

0,5	**poor**
1	**low probability**
3	**rarely**
6	**high probability**
10	**very high probability**

Table 2.2 Frequency scale (6)

Value	Explanation	Category
0,5	**Very rare**	Once a year or less
1	**Quite rare**	One or several times a year
2	**Rare**	One or several times a month
3	**Occasional**	Once or twice a week
6	**often**	One or mor eper day
10	**continuous**	Continuous or more than hour

Table 2.3 Severe scale (6)

Value	Explanation	Category
1	**Must be considered**	harmless
3	**Important**	Minor damage, first aid
7	**Serious**	Loss of working day
15	**Very serious**	Disability, limb loss, environmental impact
40	**Very bad**	Death, disability, severe disability
100	**disaster**	Multiple deaths, major environmental catastrophe

Table 2.4 Desicion and action based on risk level (6)

No	Risk value	Desicion	Action

1	**R<20**	**Acceptable Risk**	Emergency measures may not be necessary
2	**20 ≤ R< 70**	**Risk**	Action plan must be taken
3	**70 ≤ R<200**	**Important Risk**	Must be carrefully monitored and removed by annual action plan
4	**200 ≤ R< 400**	**High Risk**	Should be eliminated by taking into the short-term action plan
5	**R ≥ 400**	**Very High Risk**	Take immediate precautions by suspending work

Table 2.5 The number of risks identified before and after taking measures in risk assesment practice

Risk type	**Number of risks before taking precautions**	**%**	**Number of risk after taking precautions**	**%**
Acceptable Risk	7	10,2	69	100
High Risk	62	89,8	0	0
TOTAL	69	100	69	100

Table 2.6 Risk factors in different places in the laboratory before taking precautions

Location	**Acceptable Risk**	**High Risk**	**TOTAL**	**%**
Plastic injection unit	0	25	25	65,8
Deburring-cutting unit	0	5	5	13,2
Chemicals unit	0	8	8	21
Total	0	38	38	100

3. RESULT

Our country has been seriously focused on occupational health and safety studies due to the increasing occupational accidents and negative consequences of these accidents. As a result of these studies, Turkey is not in very good shape when compared to developed countries. In order to achieve the target of significant reduction of work accidents, it has become necessary to anticipate, evaluate and eliminate risks and to make the work more regular and effective in order to minimize these risks altogether or to minimize their losses.

Here, all possibilities are evaluated in the assessment of the targeted risk and the risks are analyzed and eliminated by preventive activities.

In this study, risk assessment was carried out in various units of an official institutional laboratory using fine kinney method. For this, the feasibility of the laboratory was obtained and the devices and areas with high risk priority were identified. Materials with high risk value used in hazardous areas are chemical material depots, spare parts production, molding and pressing, rubber production and shredding, plastic crushing, deburring, cutting and packaging, plastic injection molding machines. The risks identified in these units can be stated as follows; injury by exposure to chemical materials, diarthrosis and spinal cord injury, limb loss, hearing loss, etc. In these units, the risk assessment was carried out by the Fine Kinney method and necessary precautions were taken and necessary arrangements were made. These measures are applying the control protocol for routine execution of the process, training of personnel for each unit according to ISG rules and giving training seminars at regular intervals, protective clothing and equipment used during operation, regular maintenance and repairs of units. After these precautions, "risk acceptable" values are obtained by carrying out risk preventive activities in regions with the highest risk.

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