



Occupational Noise Exposure in Juices Manufacturing Factory in UAE

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Abstract

This investigation aimed to measure noise levels at a juice factory in the United Arab Emirates (UAE). The factory consists of nine sections. Thirty-six measurements, four measurements in each section, were taken using integrated sound level meter model CR: 264.

The results showed that the overall noise levels in the factory ranged from 75 to 89 dB(A) and exceeded the allowable level of 85 dB(A) in four areas of nine areas where the noise level was measured and workers in these areas were therefore at high risk of developing impacts health related noise.

Few workers claimed awareness about the health effects of noise and awareness about safety measures to be taken to protect them from noise.

Therefore, engineering control should be applied to reduce noise levels at the sources if technically and economically feasible. At the same time, workers should be provided with appropriate hearing protection equipment and workers should be enforced to use them during the working time.

Key Words: Noise Exposure; Hearing Protectors; Auditory and Non-Auditory Effects; UAE

Introduction

Noise usually is sound that bears no information and its intensity usually varies randomly in time. The word noise is often used to mean "unwanted sound by the listener" because it is unpleasant. Interferes with the desired sound concept, and is potentially harmful to hearing.

Noise becomes a health and safety issue in the occupational settings. According to World Health Organization (WHO) about 30 million U.S. workers are exposed to hazardous noise levels at the workplace.

Occupational exposure to excessive noise is commonly encountered in a great variety of industrial processes. It can cause many health problems that can be classified as auditory and non-auditory effects. Auditory effects include noise induced hearing loss (NIHL), and it is considered as one of the top 10 occupational disease [1-9]. Non-Auditory effects include annoyance, cardiovascular diseases, sleeping problems, masking the waning signals and interference with communication[10-12].

Noise induced hearing loss is very costly, the National Institutes for

Occupational Safety and Health (NIOSH), estimated that Approximately 242.2 million dollars are paid annually for compensation [9]. The Canadian compensation board estimated the average cost per hearing loss claim to be C\$ 14 000 [9, 13, 14].

Occupational hearing loss resulting from exposure to high noise level depends not only on exposure time but also on the frequency, intensity and the type of the noise (continuous or impact).

Over the past few decades, greater understanding of the effects of noise on hearing has led to the adoption of minimum noise exposure standards and legislation has been enacted to reduce noise exposure in many countries.

Table.1 shows The Threshold Limit Values (TLVs) suggested by the American Conference of Governmental Industrial Hygienists (ACGIH) that refer to noise levels and exposure times that represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear or understand normal speech [15].

Noise Level dB(A)	Permissible Exposure Time (Hour)
85	8
90	4
95	2
100	1
105	0.5
110	0.25

Table 1: Threshold Limit Values (TLVs) suggested by the American Conference of Governmental Industrial Hygienists (ACGIH)

If the worker is exposed to different levels of noise for different periods the TLV is said not to have been exceeded if: $C_1/T_1 + C_2/T_2 + \dots + C_n/T_n \leq 1$ Where C = Exposure time (Hour) & T = Permissible exposure time (Hour).

Control of the noise can be achieved through engineering controls, which include isolation, insulation and noise absorption, administrative controls, which include reduction of exposure time by changing production schedules or rotating workers between jobs

so that exposure times are within safe limits and provision of personal protective equipment (PPE) such as earmuffs or earplugs.

Hence, the present study aimed to measure the noise levels in one of the juice factories in United Arab Emirates (UAE).

Materials and Methods

The factory consists of nine sections. Thirty-six measurements, four measurements in each section, were taken using integrated sound level meter model CR: 264 which was calibrated before and after each set of measurements using a sound level calibrator that generated a 94-dB sound at 1000 Hz. Measurements were taken at ear level.



Results

As shown in table 2. . The overall noise levels in the factory ranged between 75 and 89 dB(A).

The overall noise level exceeded the 85 dB(A) permissible level suggested by the American Conference of Governmental Industrial Hygienists (ACGIH) in the processing area (89 dBA), Filling 3 area (87 dBA), Mixing 1 area (88 dBA), and Packaging 2 area (87 dBA).

Area	Noise Level dB(A)		Remarks
	Minimum	Maximum	
Processing	87	89	Above the standard
Filling 1	82	83	Below the standard
Filling 2	84	85	Below the standard
Filling 3	86	87	Above the standard
Mixing 1	86	88	Above the standard
Mixing (Sugar)	75	77	Machines not working during measurement
Mixing (Visco)	80	81	Machines not working during measurement
Packaging 1	82	83	Below the standard
Packaging 2	85	87	Above the standard

Table 2: The overall noise level in the plant by area

Discussion

Occupational exposure to noise in industries cannot be avoided, but can be reduced through effective engineering control procedures and / or suitable use of appropriate hearing protection devices. However, unlike industrialized countries, the effective practice of occupational health and safety has not yet been fully adopted in most developing countries.

The maximum noise levels reported in this study 77 and 89 dB (A) were comparable to the results of other international studies on noise levels in occupational settings. However, low and high noise levels were reported by other researchers [1, 4, 5, 6, 8, 16, 17].

The maximum noise level reported in the current study exceeded the standard in four sections of nine sections where noise was measured. Thus, workers in these sections are at risk of developing health problems related to noise exposure.

When engineering controls cannot be applied to reduce noise, workers must always use hearing protection devices (HPDs) when exposed to high noise levels to prevent auditory and non- auditory effects.

However, previous studies have shown that workers do not always use HPDs when necessary and that the use of HPDs in industries is very low ranging from 12% to 50% [17-19]. Many researchers reported irritation of the ears, feeling uncomfortable, interfering with functionality and communication as well as masking warning signals as reasons why HPDs were not used by workers [16-22]. Others reported that the use of HPDs is related to noise levels and noise annoyance [17, 20,22].In this investigation, a few workers used hearing protection devices, and this result is similar to other studies [16-22].

Workers' awareness of the health effects of occupational exposure to noise plays an important role in the prevention of hearing and non-auditory effects. In this investigation, a few workers claimed awareness about the health effects of noise and awareness about safety measures that should be taken to protect them from noise. Other researchers reported the same conclusion [17, 19, 23, 24].

Conclusions and Recommendations

The results of this investigation clearly revealed that the noise level was high in four areas of nine areas where the noise level was measured. Workers in these areas are at high risk of developing noise-induced hearing (NIHL), noise annoyance, and other related ailments due to excessive occupational exposure to noise and the lack of use of hearing protection devices. Most workers are unaware of the health effects of noise and prevention.

Therefore, workers should be provided with appropriate hearing protection equipment and be enforced to use them during the working time. Noisy machines should be replaced by less noisy machines, if technically and economically feasible. Also, if the factory is extended or need to replace old machines less noisy machines should be used.

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