Analysis of the Results Effects of Temperature in the Turbine Rooms on the Performance of Workers in the Power Stations.

Ahmed Ali Ajmi[1], Seri Rahayu Kamat [2] and Noor Shakir Mahmood[3]

[1, 2, 3] Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia Melaka, Melaka, Malaysia
[1, 3] Ministry of Electricity, Baghdad, Iraq

Abstract: The thermal comfort has become in the power stations, one of the largest factors that will effect on the production energy. This paper presents results of over 226 responses of workers, engineers, and operators that work in the turbine room in power stations in Iraq. Results show that 69.9% of respondents think the current job is not interested, 80.1% of respondents were not satisfied with the current job, 95.1% of respondents think the current job is very difficult, 98.7% of respondents opinion turbine room temperature is not good for temperature, and 100% of respondents not able to control the turbine room temperature. The reliability Output Analysis was between (0.702) for Bad Environment and (0.840) for worker performance.
With respect to thermal comfort the methodologies they used can assist to improve the thermal condition in the turbine room in power stations. The research presented to adopting new methods that could increase thermal comfort in the turbine rooms to power stations.

Keywords: SPSS, Environmental; Turbine; Thermal Comfort; Performance; adaptive model.

1. Introduction

In the last few decades, performance becomes a desirable goal among organizations that have led to a remarkable interest to increase the level of performance [1] This interest includes a wide range of employees in different climates and under a variety of influential factors.
The conditions of the working environment in turbine rooms are not up to the optimum desired health standards. These conditions include factors such as bad environment, performance pressure, work area, turnover intention, these factors can play important roles in increasing or decreasing performance and this relationship has attracted a large number of researchers who globally investigate this issue. Thus, performance workers can obviously influence the overall performance of any power stations [2].
The main purpose of this questionnaire was to specify the pivotal elements that affect the Performance of workers in power stations in the ministry of electricity if Iraq, elements that lead to the poor performance and then analysis these data by using the statistical software package SPSS. This study tested for the pragmatic conceptual linkage between the workers performance and effect air temperature inside the turbine room. Using correlation, regression and moderation in SPSS.
This paper will includes the most important factors that have effect on the performance of workers in the turbine room at the power station such as pressure of performance (PP), the environment bad to the work (EB), the area of the work (AW), intention of the turnover (IT) ,performers of the workers (PW) and the temperature (TEMP).

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2. Methodology

This research methodology is aimed at discussing ways in which the objectives of this study can be achieved in the given scope. This paper will discuss in detail the research procedures, the manner in which the data were collected followed by how the data was processed and analyzed to achieve the aim and objectives within the specified scopes of the study.

Research process consists of many steps. The research process requires a sequence of steps used. Below Figure 1 refers to measures throughout the research process.

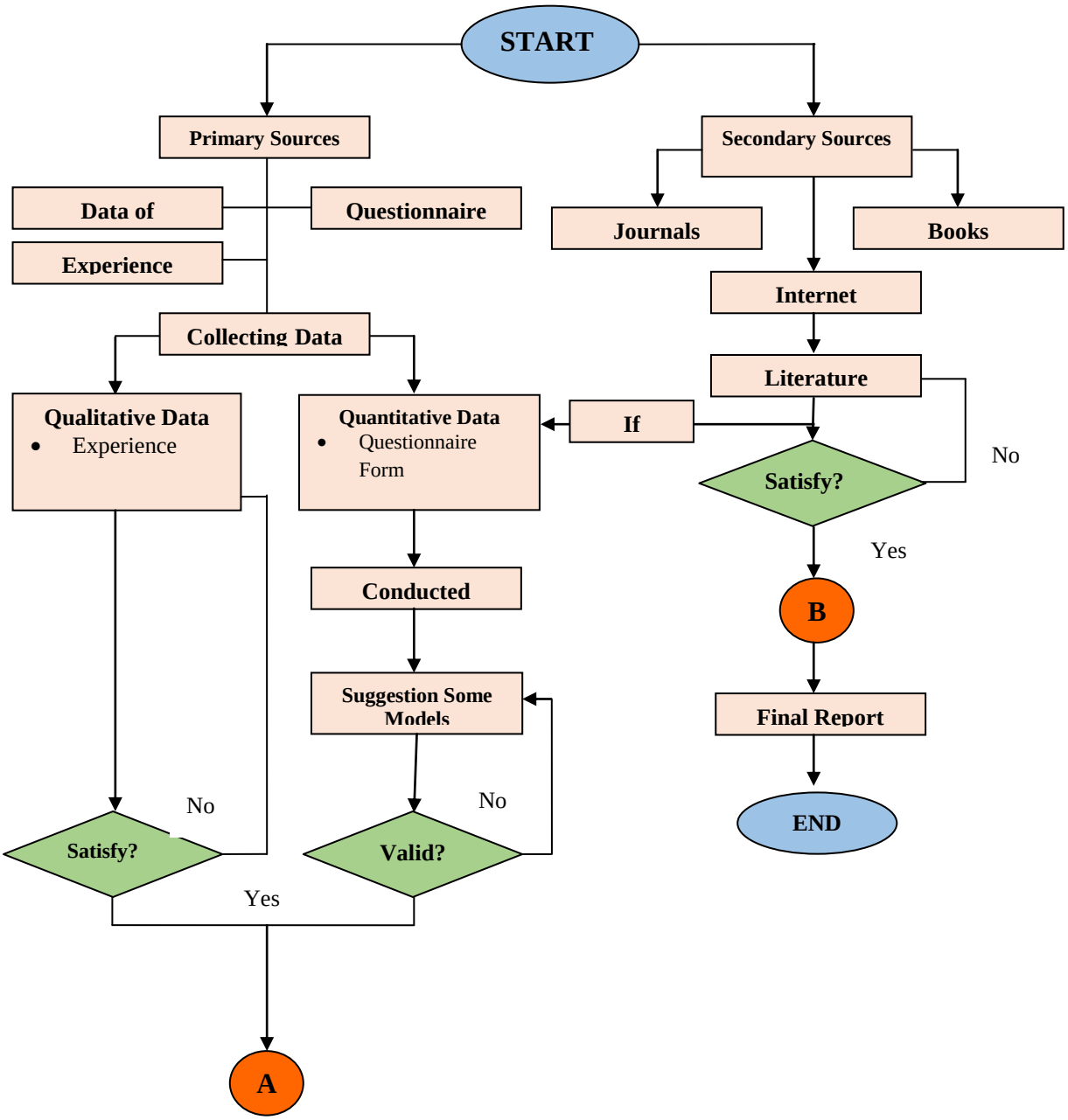

Fig.1. Steps study methodology details

2.1 Questionnaire Survey in the Power Station

The questionnaire was classified according to objectives of research, the questionnaire was divided into three sections:

(1) Section A: (demographic profile).

(2) Section B: (level of Knowledge about the temperature for turbine room).

(3) Section C: this section includes Independent variable (Performance pressure, Environment, Work Area, Turnover Intention) and dependent variable (Workers performance) and uses the temperature as a moderator.

The questionnaire has been distributed in the 226 sample like workers, operators, and engineers as shown in figure 2.

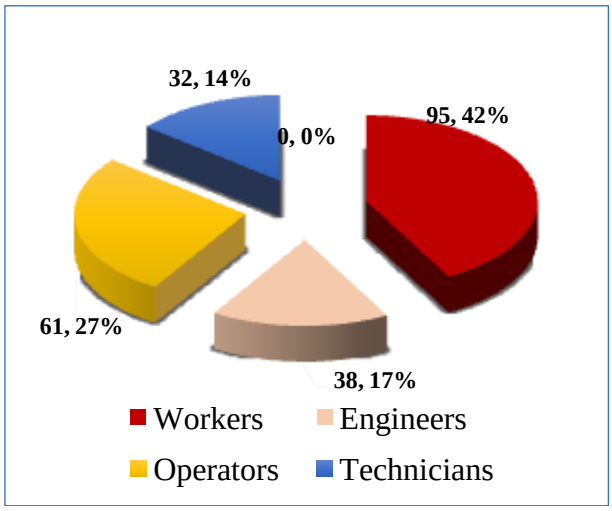

Fig.2. Samples of study

2.2 Job Position of respondents

Table 1. showed the results of the questionnaire on regards to the job position of respondents the high level of respondents are workers with 42%, followed by operators 27% and there were only 32 technicians participated in the survey.

Staff	Frequency	Percent %
Engineer	38	16.8
Technical	32	14.2
Operator	61	27.0
Worker	95	42.0
Total	226	100.0

Table 1: Results of job position

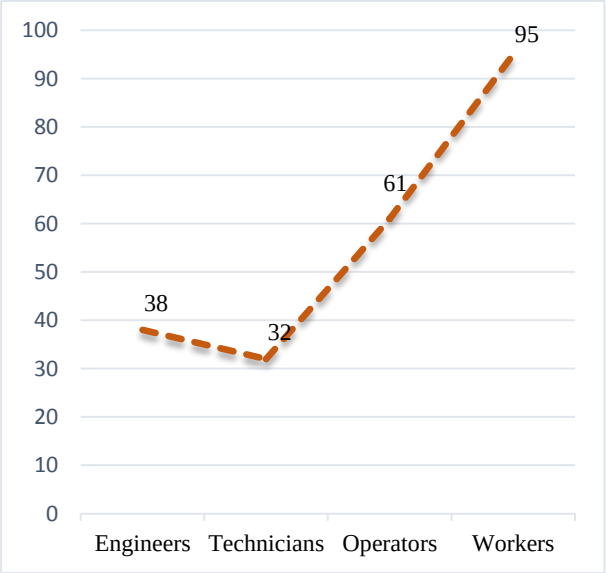

Fig. 3. Levels of the Job Position

2.3 Levels of comfort working

Pie charts 4, 5, 6, and 8shows regarding work comfort of respondents proved 69.9% of respondents is not interested in the working in the turbine room, 80.1% of respondents were not satisfied while 95.1% of respondents think

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the job is very difficult, 98.7% respondents said the air temperature inside the turbine room is not good, and 100% Loses control of the temperature inside the turbine room.

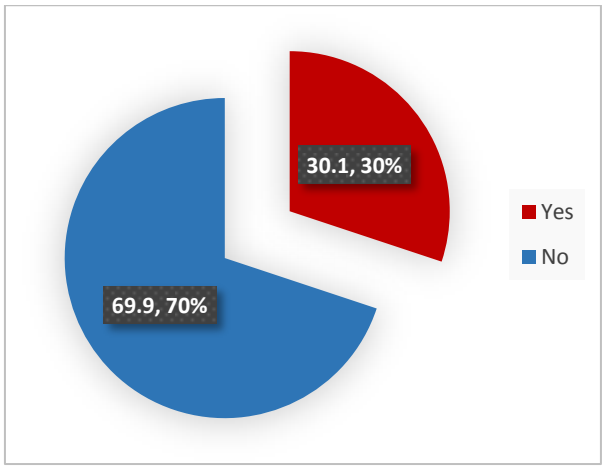

Fig. 4. Job Interesting

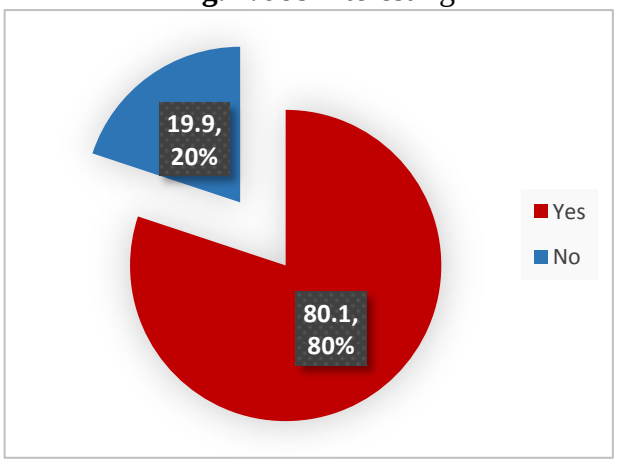

Fig. 5. Job Satisfaction

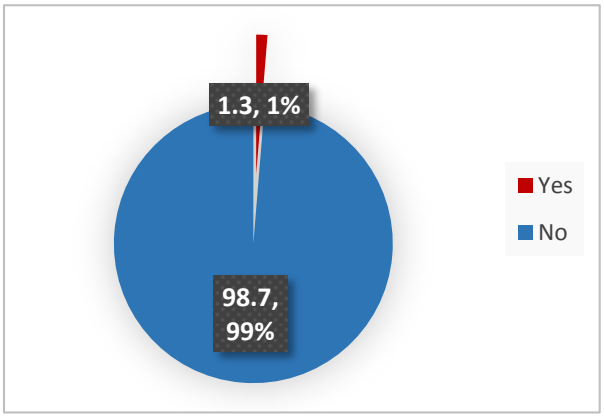

Fig.6. Difficulty of job

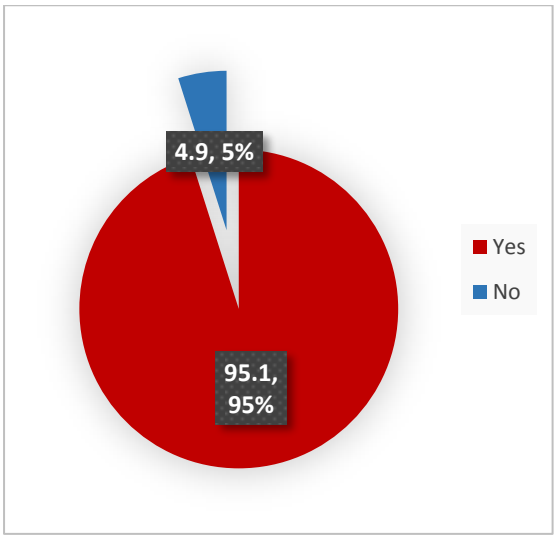

Fig .7. Temperature is good for work?

3. Results and Discussion

3.1 Analysis of Reliability

The reliability is used to the capability of a questionnaire to control on the results in all conditions. In the reliability uses the Cronbach's alpha as techniques to measure the reliability and should be greater than 0.7 (minimum) [3]. Table 2 shows the results of reliability analysis for the independ veriables:-

Table 2: Analysis of Reliability

Factors	Alpha
PP	0.731
EB	0.702
AW	0.704
IT	0.779
PW	0.840

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3.2 Regression Analysis

Table 3 shows the regression analysis of worker performance with independent variables and table 4 shows the regression analysis of the independent variables with temperature.

a) Hypothesis 1, the results confirmed the relation between the performance pressure and of worker performance is negatively (β = -0.225, p < 0.01).So the first hypothesis is acceptable by 99%.

b) Hypothesis 2, the results confirmed the relation between the bad environment and the worker performance is negatively (β = -.202, p < 0.01) 2nd hypothesis is acceptable by 99%.

c) Hypothesis 3, hypothesis the results confirmed the relation between the work area and worker performance (β = -.178, p < 0.01). So, the 3rd hypothesis is acceptable by 99%.

d) Hypothesis 4, the results confirmed the relation between turnover intuition and worker performance is negatively (β = -.198, p < 0.01). So, the 4th hypothesis is acceptable by 99%.

e) Hypothesis 5, the results showed the relation between performance pressure and the relation between is positively (β = .288, p < 0.001). So, the 4st hypothesis is acceptable by 99.9%.

f) Hypothesis 6, the results showed the relation between bad environment and the temperature is positively (β = .288, p < 0.001). So, 6nd hypothesis is acceptable by 99.9%.

g) Hypothesis 7, the results showed the relation between the work area and the temperature is positively (β = .135, p < 0.05). So, 7rd hypothesis is acceptable by 98%.

h) Hypothesis 8, the results showed the relation between turnover intuition and the temperature is positively (β = .196, p < 0.01). So, the 8th hypothesis is acceptable by 98%.

Table 3. Regression analysis I.D with the D.V

	PP			**EB**			**AW**			**IT**		
	β	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
WP	-.225**	.093	.049	-.202**	.082	.038	-.178**	.073	.030	-.198**	.081	.038

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4. **Moderation**

Table 5 present the results of analysis to the temperature as a moderating.

The moderation tool used by the Baron and Kenny (1986) and they recommended used it [4].

In this test, we will present all results that have relationship with the temperature as a moderator step by step and show other hypotheses that explain the relationship between the independent variables and dependent variables by temperature mediator.

To test the moderation the variables has been used in the software by establishing a relationship between the dependent variables and moderator (T x EP) as a shown in Table 5.

Table 4. Results of regression analysis to Temperature with I.V

	PP			**EB**			**AW**			**IT**		
	β	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
TEMP	.288**	.176	.081	.288**	.173	.079	.135*	.112	.017	196**	.132	.037

Table 5. Analysis Regression of Moderation

	PP			**EB**			**AW**			**IT**		
	β	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
PWx TEMP	.288***	.176	.081	.288***	.173	.079	.135*	.112	.017	.196**	.132	.037
	-.225**	.093	.049	-.202**	.082	.038	-.178**	.073	.030	-.198**	.081	.038
	-.228**	.098	.051	-.205**	.087	.040	-.187**	.079	.032	-.198**	.085	.038

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To continue test the hypothesis and chek the relation between the moderation and other variables we will test each variable and its relationship to the Moderator as shown below:-

i) Hypothesis 9, the hypothesis is acceptable by 99% .the relation between performance pressure and worker performance by using moderator shown in figure 8.

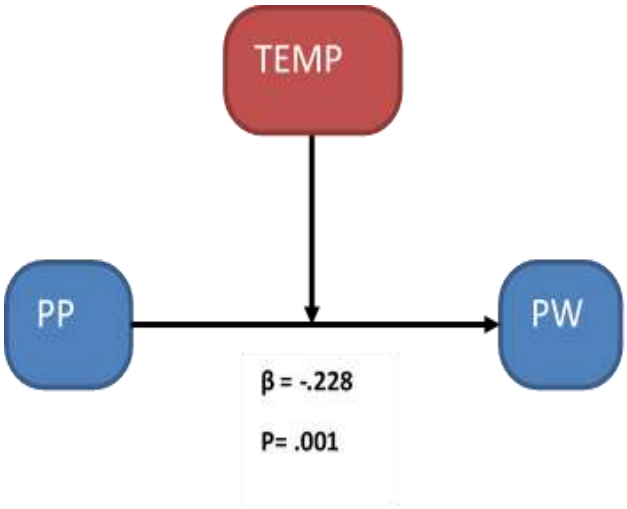

Fig. 8. Moderator between PP and PW

j) Hypothesis 10, the hypothesis is acceptable by 99% .the relation between bad environment and worker performance by using moderator shown in figure 9.

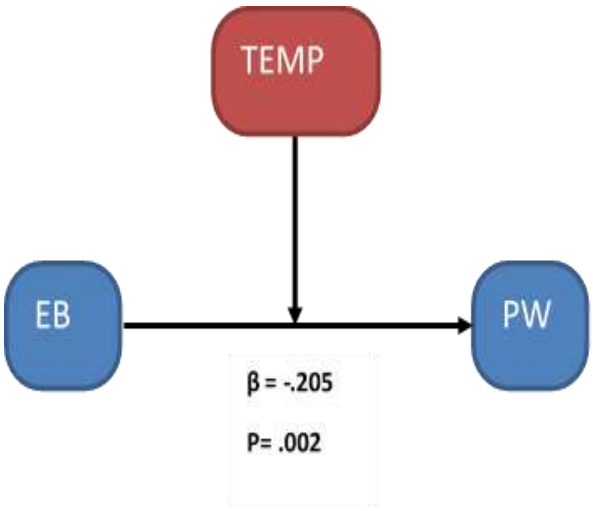

Fig. 9. Moderator between EB and WP

k) Hypothesis 11, the hypothesis is acceptable by 99% .
The relation between the work area and worker performance by using moderator shown in figure 10.

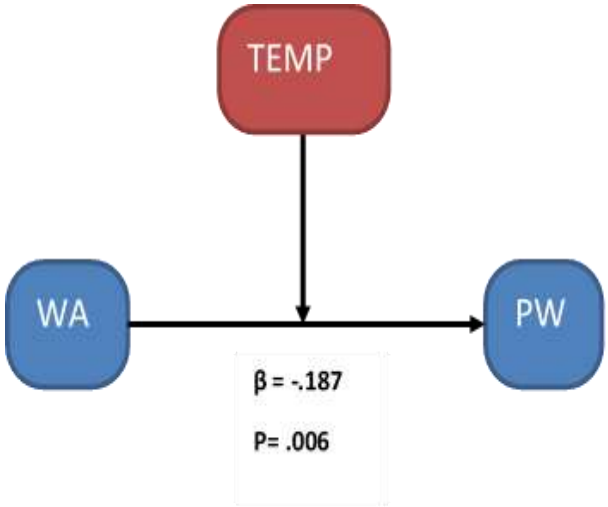

Fig.10. Moderator between WA and PW

L) Hypothesis 12, the hypothesis is acceptable by 99% .the relation between turnover intuition and worker performance by using moderator shown in figure 11.

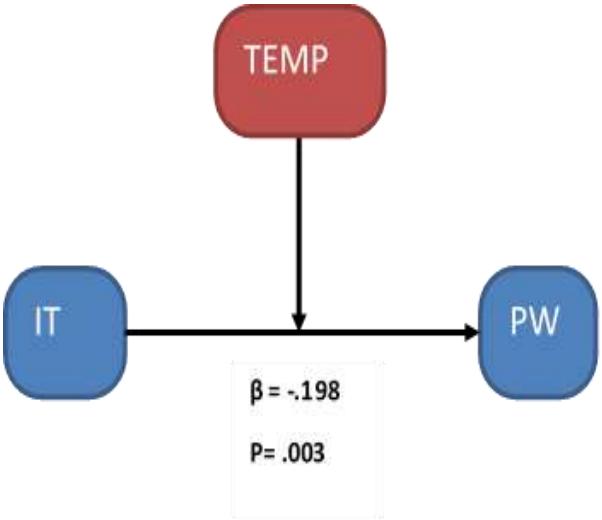

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Fig.11.Moderator between IT and WP

5. Histogram distribution

The histogram distribution can be considered it as a graphic to representation the distribution of the data and it refers to probabilities of distribution and was first introduced by Karl Pearson [5].

In this study, we have a normal distribution for all factors as a shown in flow figures.

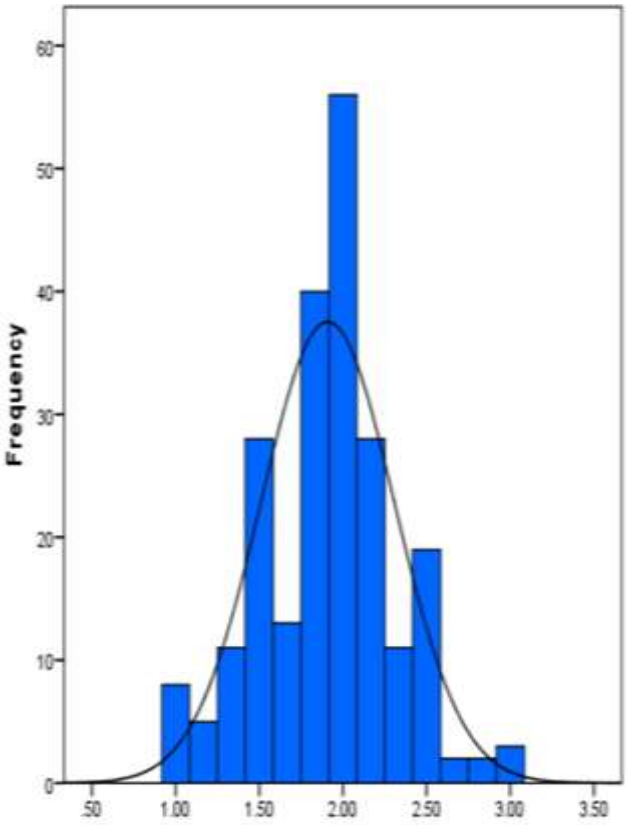

Fig.12. PP Histogram

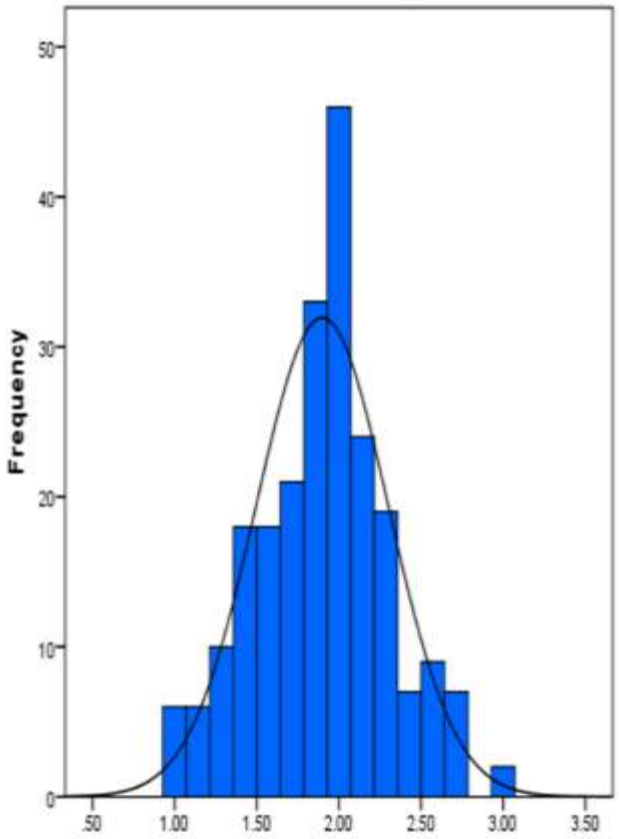

Fig.13. EB Histogram

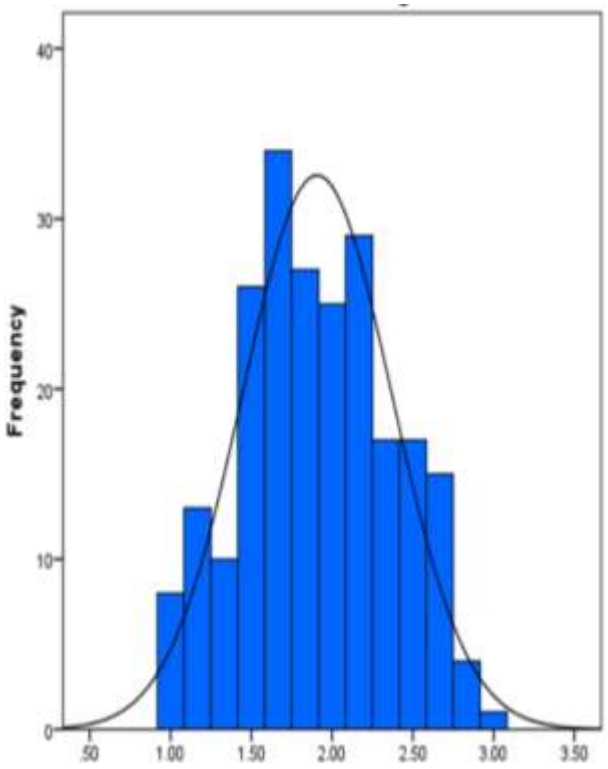

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Fig.14. WA Histogram

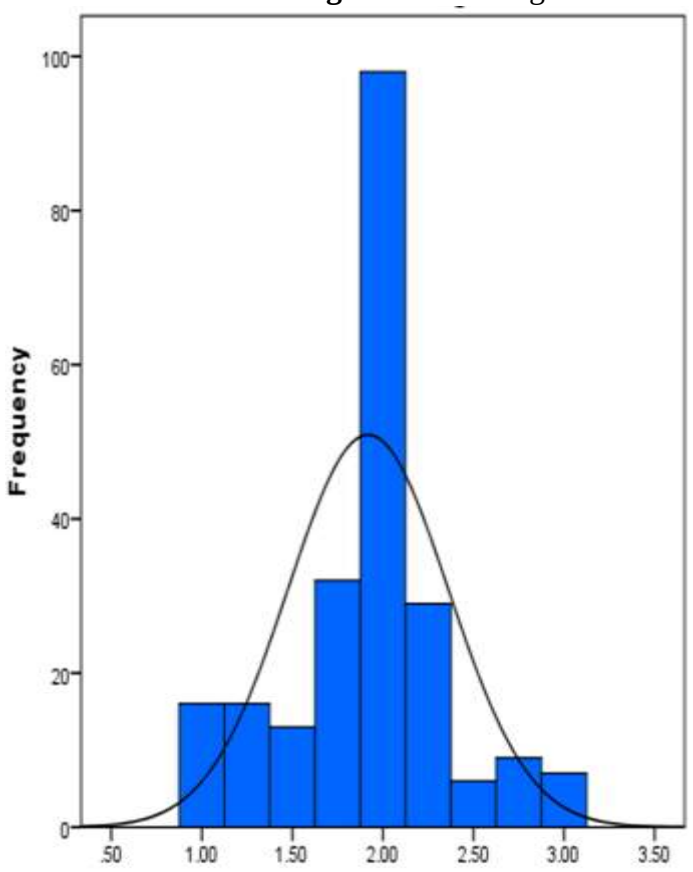

Fig .15. IT Histogram

6.Conclusion

The thermal comfort in the indoor must be subject to the ISO standards 7730:1994 that recommends acceptable conditions in which at least 90% of people are satisfied with their thermal environment [6].With regard to thermal comfort appears from this study that many of the turbine rooms in the power stations do not possess acceptable levels of thermal comfort and thus will the effect on the performance of workers.

The results of our survey in this study refer to that much higher rates of dissatisfaction to working in turbine room.

The finding of this study show the state of air temperature in the turbine rooms at the power stations and highlight the importance of post-occupancy evaluation, the result of this study has important implications for how are designed the turbine room and how to use the cooling tools that will increase performance in the power stations.

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