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Appraisal for Implementation of professional health and safety management System (Case Study: Montazer ghaem power Management Company)

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ABSTRACT

Presented study is conducted in order to assess the implementation of OHSAS18001 professional health and safety management system in Montazer ghaem power management company as one of the old power stations of country's electricity industry .Field method was the used method in this study and by the use of questionnaire and then statistical analysis of extracted data, by "SPSS" software this study has been conducted. The main issue of this study is determination of criteria to evaluated results caused by implementing of professional health and safety management system in the company which was being studied .These criteria are divided as follow by using the opinions of qualified managers and experts and also utilizing the experiences and literature matter:

-Reduction of events
- Increasing the safety and decreasing the anxiety in work place.
- Identification of work place illnesses.
- Protect the health of workers
- Improving employee's satisfaction
- Identifying and controlling the staff's hidden diseases.
- Reducing the stress in work place.
- Improving the public health and making affords to keep the work place clean.

This study has four hypothesis which they have tested by the use of questionnaire and then statistical analysis of data using "hypothesis test of comparing couples" and finally finished by statistical analysis of distributed questionnaires among the samples which are selected from statistical population, they are included all of the employees of Montazer ghaem power management company and obtained results are followed:

1. Establishment of HSAS18001 system, reduces human events.
2. Establishment of HSAS18001 system, will improve staff's satisfaction.
3. Establishment of OHSAS18001 is not effective on reducing the tensions of work place.
4. Establishment of OHSAS18001, is effective on the people's performance and consequently in company's performances.

Keywords: OHSAS18001 professional health and safety management system, evaluation system, management of electricity generation, accident, occupational health and safety.

1. Introduction

By advances in technologies and expansion of industries, effects, problem and changes was created in human life .Since, safety and mind security are now and used to be the all people demands, human, had been constantly trying to improve it and always had been trying by making necessary changes and preparation in order to control the risks in order to control the risks arising from work places or even natural disasters, able to regulate without risk or low –risk life .By accelerating the industrial developments and constant building of factories and different industrials which these kinds of industrials have naturally their own pollution for human, people are forced to think about strategies and methods to reduce the arised hazards and losses as much as possible and based on that, intellectual foundations of development and implementation of OHSAS18001 professional health and safety management system have been founded .And by developing of different procedures and guidelines and implementation of them, they were able to take a major step toward achieve the goal of "controlling the possible risk".

2. Literature Review

Safety: Safety idea has been formed at the beginning of human life on the earth .Because the early humans faced with various risks and scared of them. Including existing the wild animals and natural hazards and factors which at that time, human didn't know about the reason of their happening and therefore, they always scared and on the contrary, they showed an immune response and to deal with them, have always tried to do the precautions and defenses .To meet the safety requirement, either took an action in order to identify the causes of their happening or by inventing new tools, took action to achieve more safety.

Now, with advances in twenty –first century and development of sensitive and complex systems, we can't wait for events no longer until after happening by evaluating and analyzing, become aware of our strengths and weaknesses and understand how to avoid them but we have devised methods to assess safety and be able to identify the potential hazards. That means that, deal with to the safety problem scientifically.

Work –related accidents: Professional safety and health, is a tool at management service that can help them to achieve the goal of increasing productivity and reducing costs by preventing or reducing work –related accidents .The safety of the work place is one of the important issues for industries in order to preserve the human life and protection of investments .As science and industries are developed in today's world and human make progress by the use of them, work –related accidents and applying advanced technologies are much more harmful than the previous edition of science and technology progress and if take no action in order to prevent and eliminate these accidents, there will be painful consequences and undoubtedly it will be so difficult to compensate even in some cases, may be inevitable .Every year millions of work –related accidents happens in the world .Some of these incidents leads to death and some of them, total or slight disability .Incidents which are caused temporary disability, injured person endured pain and suffer for months and his or her family have a severe anxiety as well .And the events which leads to death permanent disability, it will have an irreversible effect on their family life

.Because of work –related accidents, besides the pain and suffer of involved people, it will resulted in losses and economical causes and it will consequences heavy losses for the entire community .And therefore avoiding such incidents is a major task and if it is neglected, the situations will be worse than though .because work –related accidents creates the largest human travails and compensation .Dangerous raised from electricity power, working with industrial machines harmful physical and chemical factors in work place, dealing with different pollutions and harms, fire and fire fighting methods including damages and risks of the work place that we can be effective to make the work place healthy especially industrials and productive places by finding ways and anticipating the incidents and preventing the work –related diseases .And solution and basis of this issue is: being fully aware of safety standards such as: designing and constructing of devices, preventing the environmental pollutions, such as: climate and nature pollutions, drinkable and healthy water, refining the industrial waste water, monitoring the industrial operations, designing the safety and fire fighting system and also identification of hazardous chemicals such as: acids, bases and salts, heavy minerals, organic and inorganic volatile and nonvolatile toxins, maintenance procedures, waste disposal and fighting against them are also important .And also being fully aware of dangerous diseases and losses caused by working in different places can be useful and effective in creating a healthy work place and prevention of damages and losses in work places.

Accident costs: About accident costs caused by workers, it can be said that, is there any possibility to estimate them? If it is possible, what are benefits of prevention calculation? In fact we may ask how much is a human life worth? From the economic point of view, the relationship between accident and prevention is necessary .Everyone knows that, accidents and their compensations are involving costs and prevention of them is involved as well .And if these costs calculated and presented in written form, the employer will bear the costs of prevention fully satisfied.

2-Objectives of the study

- Identifying the significance distance of events, satisfaction of employees, stress and efficiency of employees after and before the establishment of OHSAS18001 professional health and safety management system.
- Offering suggestions based on the obtained results of analyzing factors in order to close the incidents, indicators and negative components to zero.

3-Introduction of Montazer ghaem power management Company

Montazer ghaem power management Company (Montazer ghaem plant) which has the task of producing electricity is located in km 7 of Karaj –Malard road which includes power generation unites as follow:

- Four unites of steam with a capacity of 156.25 MW.
- Six gas unites each with a capacity of 116.4 MW.
- Three combined cycle unites each with capacity of 100 MW.

3. Methodology

This study is based on practical application in the field of establishing the OHSAS18001 professional health and safety management in Montazer ghaem power management Company, in other words, applied researches efforts to clarify the contents which are defined in hypothesis .Covered topic in this study, according to reviewing and analyzing questionnaires and analyzing the statistics of past and present events in practical .So by considering the nature and aims, it is practical .Based on followed reasons:

1. Measuring the light intensity in work place and in the case of shortage and being contrary of allowance, an action should be taken resolve the contrary.
2. Measuring the noise intensity in the work place, which in the case of being more than allowance, it should be controlled by: decreasing or isolating the people or using the personal safety devices.
3. Measuring the magnetic intensity and in case of being more than allowance, some methods should be used to prevent from hurting the people.
4. Measuring the vibrations in work place and residence places and using some ways to reduce its effects on people.
5. By doing periodical checkups, employee's health trend will be taken under control in order to have a chance to prevent from probable occupational diseases.
6. By identifying the probable risks in work place, appropriate solutions can be selected to eliminate the risks or reduce their effects.

Also this research based on the following reasons and based on the way of data collecting or answering the questions is descriptive.

1. Checking the relationship conditions between dependent and independent variables are in the real world.
2. Time range of the study is at present.
3. Its effects can be gathered, classified, analyzed, interpreted and described.

5-Hypotheses

1-Establishment of OHSAS18001 system caused reducing the human events.

2- Establishment of OHSAS18001 system caused more satisfaction of employees.

3- Establishment of OHSAS 18001 system is effective on reducing the tensions in work place.

4- Establishment of OHSAS18001 system is effective on staff's efficiency and consequently Company's efficiency.

6-Statistical population and statistical sample

The scope of OHSAS18001 professional health and safety management system certification is for Montazer ghaem power management company, so statistical population of this research are all of the staffs of Montazer ghaem planet. The majority of them are diploma and associate degree and some of them are below diploma and about 16% of employees are M.B. and M.S. that samples were selected among them.

Thus according to the number of statistical population in this study, statistical sample is included 16% predicted statistical population members .The total size of the population is 495 .In this

study, field work method has been used in order to gather information .The most common technique in field researches for gathering data is using questionnaire and in this study questionnaires have been used as well.

7-Variables or research

In this study, establishment of OHSAS18001 professional safety and health management system is independent variable and:

- Reducing the human events.
- More satisfaction of staffs.
- Reducing the work place stress.
- Effectiveness of staffs and company are dependent variables.

The questionnaire consists of 27 questions and each of these above 27 questions are statistical variables and measured in ordinal level and on "Likert" scale .The value of these variables are: 1, 3, 5, 7 and 9 which are respectively correspond to very low, low, medium, high and very high options.

8-Reliability of research tools

In order to determine the reliability of designed questions, Cronbach alpha coefficient and by the help of SPSS software was used.

Cronbach alpha coefficient formula is as follow:

$$\alpha = \frac{N}{N-1}\left(\frac{\sigma_x^2 - \sum \sigma_{y_i}^2}{\sigma_x^2}\right)$$

α =crobach alpha coefficient

N =number of questions

σ_{yi}^2 =Y_i variable variance (variance of answers given to the "I" question)

σ_x^2 =X variable variance (variance of answers given to the questions)

In general, Cronbach alpha coefficient is proportion of actual variance to variance of the entire society and thus its value is always positive and between one and zero.

Calculated alpha coefficient through SPSS software is equal to: 0.9936 which is exactly the same with calculated results in the attached appendixes.

To determine the role of each factors, related variables can be built for example, a variable which measures the effect of reducing human events factor and is equal to the sum of responses given to the ten questions related to the reducing to the human events and then, responses to each bipolar spectrum options, the number of responses: very high, high, medium, low and very low founded .After encoding the options, once manually and once by the help of "SPSS" software, meanwhile extracting the scattering indicators of sample comments, in case of investigating the obtained results of establishing the OHSAS18001 professional safety and health management system, initially it has been investigated through descriptive statistics and then analyzing the related data to each hypothesis and hypothesis testing .In this study, a comparison between responders viewpoint variable about establishing the professional safety and health management

system with number 6 have been done .Mentioned number in distributed questionnaires has been evaluated as above average score.

4. Finding

The quadruple stages of statistical hypothesis testing will be outlined .The stages of statistical hypothesis testing for mean population (μ_x) is as follow .While in statistics and parameters parts, they have "d" sign (Azar and Momeni, 2002).

1. Research hypothesis and its contradictory defined as follow:

Contradictory claim $H_0 : \mu_d \leq \mu_0$

Claim $H_1 : \mu_d > \mu_0$

If the average of responder's answers of statistical population is more than (μ_x), it indicates that, the obtained results of establishing the professional safety and health management system is better than expected average situation and therefore hypotheses of research and their contradictories are defined as follow:

Contradictory claim $H_0 : \mu_d \leq 6$

Claim $H_1 : \mu_d > 6$

Here, research hypothesis due to lack of equality has placed in H_1 and its contradictory has placed in H_0

2. Test: "d" statistic has student "t" distribution (Azar and Momeni, 2002) while σd is determined for couple scores, normal distribution (Z standard variable) can be used. Because "t" distribution is compatible for both n>30 and n<30 so the only statistic test is:

$$t = \frac{\bar{d}}{s_{\bar{d}}}$$

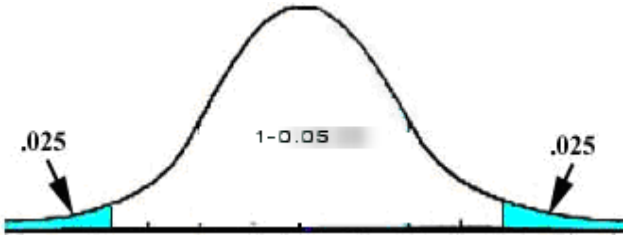
3. The critical value: according to determine α (5%) and 95% ensure level (1-α) and based on mentioned statistical hypothesis, the kind of test is: "right test sequence" and its curve is as follows (figure 1):

Contradictory claim $H_0 = \mu_d \leq 6$

Claim $H_1 = \mu_d > 6$

Error level $\alpha = 0/05$

Freedom degree d.f = n-1 = 68-1 Critical value 1/669



Now, the critical value can be obtained based on "student t" table and with regard to the level error of 5% and freedom degree of 67.But the probability of error is also calculated in "test error t" column by "spss" software. Numbers below this column shows probability of error of

statistical hypothesis. If this amount of probability is less than or equal to α (5%), zero assumed (H_0) will be rejected otherwise, the other hypothesis (H_1) will be rejected.

4. Decision making: At this stage, the value of statistic test calculated and compared with critical value in the third stage. If statistical test placed in H_1 area, H_1 assumption can't be refused in ensure level of 95%. Otherwise, sample data didn't provide strong evidence to approved H_1 and reject it. If test statistic placed in H_1 area, H_0 assumption or contradictory claim will be rejected in other words our claim which average is more than 6, can't be rejected. If the statistical test placed in H_0 area, contradictory claim can't be rejected and our claim H_1 based on being more than average 6 are rejected.

Calculated results are presented in Table: 2, 3, 4 and 5.

Table 1: results of the first hypothesis calculations

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 TOT_H1 -	.8118	1.64485	.19947	.4136	1.2099	4.070	67	.000

Critical value: t =1.669

Results of the first hypothesis testing by: t- student

Calculated value: t =4.070

Table 2: results of the second hypothesis test calculations

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 H2 -	1.1555	1.75741	.21312	.7301	1.5808	5.422	67	.000

Critical value: t =1.669

Results of the second hypothesis test by: t- student.

Calculated value: t =50422

Table 3: results of the third hypothesis test calculations

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 H3 -	-.5765	2.10061	.25474	-1.0849	-.0680	-2.263	67	.027

Critical value: t =1.669

Results of the third hypothesis test by t- student:

Calculated value: t =-2.263

Table 4: results of the fourth hypothesis test

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 H4 - [illegible]	.7471	1.69973	.20612	.3356	1.1585	3.624	67	.001

Critical value: 1.669

Results of the fourth hypothesis test by: t- student:

Calculated value: t =3.624

Table 5, Indicators of descriptive statistics shows the overall results.

Table 5: Indicators of descriptive statistics "overall results"

Maximum	Minimum	Amplitude	Coef. Of chol.	Coef. Of skewness	Variance	Standard deviation	Mode	Mean	Average
9	1	8	-0.740	0.050	4.4289	2.1045	7	7	6.632

5. Discussion & Conclusion

Evaluation of the overall results of the study by the help of data statistical analysis:

At this stage of investigation, the overall results of the study have been assessed based on statistical analysis and hypothesis of research separately.

1. First hypothesis: it can be claimed with more than 95% of ensure that, establishment of OHSAS18001 system in Montazer ghaem power management company, cased decreasing the human events.

2. Second hypothesis: it can be claimed with more than 95% of ensure that, establishment of OHSAS18001 system in Montazer ghaem power management company, cased increasing the staff's satisfaction.

3. Third hypothesis: it can be claimed with more than 95% of ensure that, establishment of safety and health management system in Montazer ghaem power management company, is not effected on decreasing the work place stress.

4. Fourth hypothesis: it can be claimed with more than 95% of ensure that, establishment of safety and health management system in Montazer ghaem power management company, is effected on staff's efficiency and consequently efficiency of company.

Table 2 shows the summary of statistical calculations belongs to the data analysis of hypothesis components.

Suggestions

In this part of study, by surveying the responders about the problems of establishing OHSAS18001 system, following statements were brought up:

1. They can be made for the Success of established management system, have an important role. Taking serious attention to the to the employees and their needs is something that

most of the staffs referred to it demanded to has done in order to increase the efficiency of OHSAS18001 system in company.

2. Need for taking serious attention of management to the staffs and enhancing the desirability of work place and more staff's satisfaction is another thing seeks the management to pay serious attention.
3. Since by establishing the system, various medical tests are required to perform and these requirements done, if after doing them there were a necessity to change the carrier in order to improve the health of employees, suitable solutions should be provided for this job changing till the employees tend to do it with no concern.
4. More and better relationship of manager representative with employees to establish the system and being in line with company's goals can have an important role to improve their attitude and staff's evaluation toward the establishment of system.
5. It is recommended that, obtained results from periodic scans and tests of personnel install in bulletins in form of charts in order to inform all employees and positive results in this regard inform the personnel.
6. It is recommended that, in order to clarify the serious determination of senior managers to implement the established system, costs made in achieving the objective of the system, brought to the notice of staffs.

Table 6: Statistical calculations related to the data component analysis of hypothesis

Conclusion of Test	Amount of Critical	t	Standard Deviation	Mean		Hypotheses	Variable	Row
				Mean High	Existence			
Accept	1.669	4.070	1.949	6	6.09	۱	Accurate identifying the risks of daily activities	1
			1.923	6	5.88		The safety and health training and its role in staff's health	2
			1.581	6	6.7		Installing the safety warning signs	3
			1.581	6	6.59		Requirements of OHSAS18001 system	4
			1.541	6	6.85		Safety guidelines for working with equipments	5
			1.870	6	7.12		Observance of public health	6
			1.549	6	7.97		Safety and protection guidelines against ionizing radiations	7
			1.483	6	7.79		Employees acquaintance with explosives and their effects on reducing the events	8
			1.516	6	7.02		Systems and equipment of firefighting	9
			2.049	6	6.23		Checklists and periodic safety visits	10
Accept	1.669	5.422	1.729	6	7.09	۲	Considering the public safety and health guidelines	11
			1.824	6	7.15		Periodic inspections and identification of hidden staff's diseases	12
			2.262	6	6.59		Doing audiometric tests	13
			1.489	6	7.56		- Identify the pollution of work place	14
			1.593	6	7.32		Identify the common occupational diseases	15
			2.351	6	6.18		Change staff's job to have a better health	16
			1.609	6	8.2		Health tests of service personnel	17
Rejection	1.669	-2.263	2.224	6	5.47	۳	OHSAS18001 requirements and their role in lighting	18
			2.406	6	3.62		OHSAS18001 requirements and their role in noises of work place	19
			2.295	6	6.29		Installing the warning systems and their roles in reducing anxiety in the work place	20
			2.165	6	4.88		The role of OHSAS18001 system in improving the work place temperature	21
			1.791	6	6.85		The role of using the safety equipment and personal protective in reducing the work place stress	22
Accept	1.669	3.624	1.688	6	5.79	۴	The role of establishing the system on considering the safety	23
			1.886	6	6.62		anticipated maneuvers and their effects on preparedness and emergency response	24
			1.673	6	6.82		"MSDS" forms and their effects on controlling and reducing the chemical harms	25
			2.190	6	6.65		The impacts of staff's periodic test results	26
			1.428	6	7.85		Rate of success in reducing workplace stress	27

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