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Crisis Management Study of using Nano-Technology in the Petrochemical Industry

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Abstract
The purpose of this paper is to manage the crisis caused by nano-technology in the petrochemical industry (Emam port). The collection of information contained in the petrochemical industry On the application of nanoparticles and the problems created by preparing questionnaires and to provide it on two levels: Managers and technical experts then analyze it done And also to study the biological effects of nano-technology in the petrochemical industry on the environment, economic and social examined, The results showed that more than 90 percent of nanoparticles in Emam port in terms of dealing with the crisis are senior technical staff. Results showed that higher-than-average exposure to nanoparticles staff on mental health and quality of life of employees working in a negative effect. In other words, no matter how critical nanoparticles increase the exposure of employees with mental health and quality of work life of senior technical staff decreases. Based on the results nanoparticles crisis, global warming and the mortality rate of fish cumulative effect this means that if the amount of exposure to nanoparticles is critical to global warming exceeded is added. Frequently caused by the publication of critical nanoparticles butadiene (RA) under the headings inappropriate responses health-environment, frequently economic and social responses in approximately 43/48% of the total variance of responses caused by the release of nanoparticles are critical.

Keywords: Crisis, Nanotechnology, Petrochemicals, Environment.

Introduction

Chemicals are massively in human life and are an integral part of human life. But concerns about their effects on human health and the environment are a global issue. Currently, there are approximately 575 000 chemicals each year 100 new chemicals enter the market in throughput. Obviously, the health and environmental implications of these materials can be varied depending on the type and composition of these materials are. Although there is little information about chemical hazards, but many governments (especially in developed countries) have established

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regulations to protect employees and the public. These rules will force the industry to eliminate the risk of chemical hazards or to minimize that risk management will be the means.

Another important definitions of dangerous substances, a definition that was presented in 1985 by the United Nations Environment According to the definition of hazardous substances in materials ranging from solid, sludge, liquid and gas in the tank except for radioactive materials and infectious referred with chemical, toxic, explosive properties or other properties as a means to human health or the environment alone or when mixed with other materials, they create a hazard.

In most of the industries, especially the oil industry employees are in contact with materials from different chemical the lack of the Occupational Safety and Health when working with a variety of adverse effects they will have. To decide on measures to control and reduce risk to an acceptable level, it is necessary health risks resulting from occupational exposure to chemicals in these sectors specifically to assess health risks from occupational exposure to chemicals, as one of the key elements in the system of health, safety and the environment should be considered.

Development of new industries has led to compounds that are risky to the environment to some of their effects on humans and the environment would be irreparable. Nano materials have in recent years due to the excellent characteristics of electrical, optical, mechanical and chemical attracted much attention (Strunk, 2009). Crisis management is a set of activities or processes to identify, study, or predicted the crisis and a series of measures that enables organizations to prevent or effectively managing the crisis. Crisis management planning process and the performance of state papers, executive agencies and non-governmental and public organizations Viewing, analyzing the crisis for integrated, community-ordinate and using existing tools trying to follow the crisis or in the event in order to mitigate, prepare for, respond quick relief and recovery to achieve normalcy and reconstruction work (Shakib and Mousavi, 1385).

When you turn on the properties of materials at the Nan scale chemical, biological and catalytic activity changes caused them. Hence materials in bulk (mass) are safe when they are converted into nanoparticles can be toxic and dangerous. In addition, the small size of nanoparticles makes up the material that they can overcome immune barriers (Erb et al., 2002, Strunk, 2009).

Another factor that is causing concern about nanoparticles is that nanoparticles can be connected to other hazardous pollutants in water or air or react with them and therefore their entry into the body easier.

In addition to concerns about the way this material through breathing, skin and mouth, they worry about the transfer of organs other than the target organs such as heart devices, vascular and nervous and the emergence of public works there. Several studies on the toxicity of engineered nanomaterials in the early 1990s in some countries, such as Japan's. In this study, specific responses after injection, metal particles, suspended in saline, standard scale (with an average diameter of 5 micrometers) and in ultra-small scale (20 nm diameter), into the trachea rats, were studied. In this study, it was found that nano-particles than particles, micro-scale, the development of lung inflammation involved (Heinlaan et al., 2008; Zhang et al., 2000; Zhang et al., 2003).

Environmental studies related to chemical pollutants, mainly including monitoring (measurement of pollutants, such as water, sediment, soil) and biological (the amount of pollutants in the body) in natural ecosystems (deMora et al. 2004; Abdallah, 2008). Although monitoring of chemical pollutants is relatively easier and sometimes cheaper, but enough about the biological organism to contaminants does not provide access (Giusiti, 2001). The natural environment has undergone drastic changes physical and chemical factors were ruling which

leads to serious discrepancies in the data from the monitoring of chemical pollutants. Biological monitoring can be done using appropriate biomarkers, More reliable method that more reliable information about the bioavailability of contaminants and their possible effect of the puts (Amiard et al. 2006). The aim of this study was to investigate the effects resulting from activities of Arvand Petrochemical Complex is located in Special Economic Zone Emam port.

Materials and Methods:

Study Area

Emam port (RA) is located at the north end of the Persian Gulf is Iran's largest port. Industry and petrochemical complexes in the area of wastewater units, Nanoparticles waste into the sea, as well as numerous traffic sediments dredged to facilitate the movement of ships and ships can Increase the amount of pollution, including nanoparticles in this area due to the potential contamination of Emam port to nanoparticles, it is necessary to study these pollutants and their effects on organisms, plants, and humans have been conducted.

Research Methodology

The method used in this study in terms of the amount and degree of control, you know, because of all the variables of interest in the natural state, has been studied. The study of the control variables, the type of trial, in terms of the nature of the research survey strategy is applied; It aims to provide an appropriate model to manage the crisis caused by nano-technology in the petrochemical industry (Emam port) is Planning to achieve optimal performance in various aspects of environmentally sustainable development will be used. In conjunction with the methodology, initially descriptive and considering that the aim of this research in neurologic effects on the environment of biological nano-technology in the petrochemical industry, economic and social, Ali-associated nature of this type of research. The collection of information contained in the petrochemical industry on the application of nanoparticles and the problems created by the preparation of the questionnaire and put it on two levels: Managers and technical experts then analyze it based on statistical model PSIR and models such as t univariate regression analysis.

The hierarchical structure of the process to determine the environmental pollution from the petrochemical industry to do it. The two main criteria affecting the health of people and environmental degradation that each of the following criteria are divided, was considered. Under the four regional aquatic habitats include: Section enclosed and free Zangi, Musa creek and estuary were classified parsley and ecological value and vulnerability of the two components were compared with each other couple. In each of the designated habitat, Effect on all live parameters include: the effect of the density and diversity of aquatic plants, fish, benthic communities, birds And the effect on abiotic factors (physical and chemical) water was weighted. In the hierarchical structure in order to determine the most important air pollutants, most major petrochemical gases emitted in the study include: NOX, SOX, CO, H2S, suspended particles as options were considered for the comparison test. The impact of air pollution on sensitive habitats and vulnerable region in terms of value ecological were scoring. The effects of air quality on health effects of mold was measured.

The population studied

The initial analysis of information obtained from the study of nano-particles is used in the petrochemical industry. In subsequent analysis The study consisted of questionnaires completed by experts associated with the petrochemical industry organizations, authorities and environmental effects of the use of nano particles in. In the final stage, due to limited population sample selection, the census will be carried through. It is estimated that a sample size of 50 people.

Sample size and sample selection from the community

Random sampling in this research is purposive sampling method. Choose a sample size due to limited population of 50 people.

Data Collection tools

In this study, gather data and measure the variables in the study is a library and field study Thus, at first using the library resources such as research projects related to the topic, master's and doctoral theses, Publications on air pollution, books and Internet resources, is to prepare a questionnaire After field studies done using questionnaires. Thus, using the techniques of observation and interviews are completed.

Validity

This question refers to what extent research tool can measure the characteristics of the research in question. There are several methods for determining the validity of the questionnaire are: content validity, criterion validity, construct validity and credit factor in this study to determine the validity and reliability of validated questionnaire was used to determine validity.

Reliability assessment tool determines how reliable the results from the measurement, with accuracy and precision are. Or in other words, if the measurement is repeated under the same conditions, to what extent is expected to achieve the same results. After conducting a literature review in research, questionnaires were pilot study were provided. To check the reliability of the questionnaire to conduct a study conducted Help the necessary modifications to the data collection on a large scale, done. . Study Guide of respondents who were not part of the original sample, or reliability Shd.atmad do little problem and techniques to measure Ander designed items to measure the variables, Cronbach test was Lfaastfadh.

Cronbach's alpha test research tool used to calculate internal consistency. Such tools answer every question can adopt different values. In this study, the reliability of various sections of the questionnaire through Cronbach's alpha was evaluated using the following formula:

$$a = \frac{J}{J-1}\left(1-\frac{\sum Si^2}{S^2}\right)$$

J= subset of the set of questionnaires or tests; Si =ANOVA test with I; S= total variance.

Cronbach's alpha fluctuate between zero and one $0 \le a \le +1$If α=1 If the indicator is full credit and research tool α=0 is evidence that it is completely invalid. Cronbach's alpha test calculation results are shown in Table Tyrf variables.

Analysis tools and models

The aim of data analysis and interpretation to reduce them and making data understandable form so that we can study examined the relationships between variables. In the present study to analyze the data and achieve the aforementioned objectives using descriptive and inferential statistics by SPSS version 22 was used who went on to describe them.

Descriptive Statistics

In this study, descriptive statistics such as: frequency, percentage, mean, variance, standard deviation, correlation, etc. are used.

Inferential statistics

Inferential statistics allows the researcher to go through the interpretation of data, concluded it to make decisions. The analytical method for the expression and relationship between variables and their impact on and exploitation. In this study, depending on the type and level of scale variables, using student t-test, regression analysis and principal component analysis (EFA) has been analyzing results.

Result and Discussion

As part of the inventory of items to evaluate the effects of nanoparticles on critical social environments that social capital is composed of evaluation. In order to analyze the critical particle effects on the social environment of linear regression is used. In this way, the social environment in this study with 3 variables mental health staff, Quality of work life and employee participation in research is examined in relation to nanoparticles in petrochemicals. Table 1 shows that the nanoparticles are critical in the face of a percent error rate on mental health staff and affect their quality of working life. In other words, one can say with 99 percent certainty around 28 percent of the variation in mental health staff and 17 percent of the changes in employees' quality of life variables and the nanoparticles are critical. This table also shows that the nanoparticles are critical to the participation of senior technical staff in research related to the effects of nanoparticles crisis does not make sense.

Table 1. Evaluation of the effects of nanoparticles on the variable critical petrochemical mental health personnel, quality of work life of employees and employee participation

Independent variable	The dependent variable	F	R^2	R	significant amount
Critical nanoparticles	Mental health staff	8.29	0.28	0.52	**0.00006****
	Quality of work life	0.03	0.17	0.41	**0.0001****
	Involvement in research on nanoparticles	0.04	0.001	0.035	0.59

** At the level of one percent error

Table 2 shows the level of exposure to nanoparticles critical error if the variable is incremented Senior technical staff of about 0.60 mental health of variance decreased as well if the variable is

incremented critical nanoparticles senior technical staff of the variance in quality of life is diminished 0.41. In other words, one can say with 99% confidence crisis nanoparticles in the previous section on mental health and quality of life of working in senior technical staff has a negative effect.

Table 2. nanoparticles are critical factors to determine the impact on their mental health and quality of work life

Independent variable	The dependent variable	t	Standardized coefficients Beta	Non-standard coefficient B	Constant factor	significant amount
Critical nanoparticles	Mental health staff	1.19	-0.60	-0.48	0.41	**0.0001****
	Quality of work life	2.87	-0.41	-0.52	-0.45	**0.0001****

** At the level of one percent error

As part of the questionnaire number of critical items to evaluate the effects of nanoparticles on the economic environment that consists of two components: medical expenses, income, employment and non-employment income is raised In order to analyze the economic environment acclaimed a critical particle effects linear regression is used.

Table 3 shows that the level of critical error percentage nanoparticles by about 55 percent and 51 percent of the variation in Non-job income and senior technical staff to predict health care costs.

Table 3. Evaluation of the effect of nanoparticles on the variable Petrochemical crisis in mental health personnel, quality of work life of employees and employee participation

independent variable	The dependent variable	F	R^2	R	significant amount
Critical nanoparticles	Employment income	5.55	0.01	0.10	0.45
	Income Ghyrshghly	16.46	0.55	0.75	**0.0001****
	medical expenses	38.66	0.51	0.71	**0.0001****

** At the level of one percent error

Table 4 shows the critical nanoparticles on the surface of a percent error rate on non-employment income has a negative effect. In other words, one can say with 99% confidence level of exposure to nanoparticles is critical if the variable is incremented 35/0 non-employment income of variance is reduced. Also critical nanoparticles on the surface of a regular staff of senior technical error have a positive effect on health care costs. In other words, one can say with 99% confidence incremented if the variable amount of exposure to nanoparticles is critical to 26/0 variance added health care costs.

Table 4. Critical factors determining the effect of nanoparticles on income and medical expenses Ghyrshghly

independent variable	Standardized coefficients Beta	Non-standard coefficient B	Constant factor	significant amount
Critical nanoparticles	-0.35	-0.48	-0.41	**0.0001****
	0.26	0.38	0.35	**0.0001****

** At the level of one percent error

As part of the questionnaire number of critical items to evaluate the effects of nanoparticles on the environment was raised. In order to analyze the critical particle effects on the environment is acclaimed a linear regression. Table 5 shows the 99% confidence crisis nanoparticles by about 65 percent, 55 percent, 57 percent and 33 percent of the variation in the variables of global warming, the rate of mortality of aquatic, soil quality and water quality are made.

Table 5. Evaluation of the effect of nanoparticles on the variable petrochemical critical environmental resources

independent variable	The dependent variable	F	R^2	R	significant amount
Critical nanoparticles	Heating the planet	68.16	0.65	0.81	**0.0001****
	The mortality rate for fish	34.47	0.55	0.65	**0.0001****
	Soil quality	44.14	0.57	0.67	**0.0001****
	Water quality	38.94	0.33	0.45	**0.0001****

** At the level of one percent error

Table 6 shows the 99% confidence if the nanoparticles are critical variable is incremented by the variance of global warming and fish mortality rate 39/0 and 48/0 is added. Also one can say with 99% confidence If the variable is incremented critical nanoparticles variance of soil quality and water quality 31/0 and 34/0 respectively to be reduced.

Table 6. Coefficients determine the effect of heating nanoparticles crisis on the planet, the rate of mortality of aquatic, soil quality and water quality

independent variable	The dependent variable	t	Standardized coefficients Beta	Non-standard coefficient B	Constant factor	significant amount
Critical nanoparticles	Heating the planet	1170	0.39	0.18	0.44	0.0001**
	The mortality rate for fish	15.88	0.48	0.26	0.48	0.0001**
	Soil quality	10.10	-0.31	-0.12	0.51	0.0001**
	water quality	3.29	-0.34	-0.15	0.36	0.0001**

**At the level of one percent error

Table 7 shows the results of tests to determine the suitability varimax rotation: item is to perform exploratory factor analysis. The results of 4-9Nshan the table at one ten-thousandth percent: item suited for measurement errors caused by environmental factors related to response are critical to the release of nanoparticles.

Table 7. Varimax rotation test responses to the environment caused by the release of nanoparticles

Variable	Bartlet test	KMO	Variable
Frequently created an environment of emissions of nanoparticles	3/95	0/71	0.0001**

** A significant level of error

Table 8 shows the results of the factor loadings caused by the release of nanoparticles crisis shows responses. According to Table 4-10 Responses can be said that the crisis created by the release of nanoparticles butadiene (RA) under the headings inappropriate responses health-environment,, Responses to economic and social responses in approximately 43/48% of the total variance of responses caused by the release of nanoparticles are critical.In other words, inappropriate responses to environmental health with 5 items and about 19.4 percent of the variance in responses to the crisis caused by the release of nanoparticles butadiene (RA) forms among other factors that have the highest impact.. As well as economic and social responses, each with 62/18 percent and 77/10 percent respectively 4 items and 3 responses caused by the publication of critical nanoparticles butadiene (RA) causes are.

Conclusion

T-test was determined by univariate critical nanoparticles in Emam port (RA) include barium sulfate,Bentonite, carboxymethyl cellulose, lignite, polyacrylamide, Laymstvn, Frvbar- iron oxide, antibacterial materials -Frmaldhyd, DEFOAMERS materials, food emulsifier, sodium silicate, anticorrosion materials, xanthan step, his melancholy, lubricants, sodium perborate, poly aluminum chloride-containing aluminum chloride, mica-containing silicate, Mvadkntrl -Rvy oxide H_2S gas, H_2S gas Mvadkntrl -Rvy carbonate, sodium bicarbonate, cement and guar gum, starch, Sfasvl and lime.The nanoparticles can be said that more than 90 percent in Emam port in terms of dealing with the crisis are senior technical staff.

Results showed that higher-than-average exposure to nanoparticles staff on mental health and quality of life of employees working in a negative effect. In other words, no matter how critical nanoparticles increase the exposure of employees with mental health and quality of work life of senior technical staff decreases.

The results showed that exposure to higher than average income of employees and non-employees nanoparticles can have the negative effects.The result of this is due to the negative effects of nanoparticles on health staff, staff from carrying out economic activities outside the administrative time stops. The results of this section show that the nanoparticles are critical in medical costs, senior staff technical positive effect so that exposure exceeded the nanoparticles are critical adverse effects on human health consequently increase health care costs of employees (butadiene) (RA) is.

According to the results nanoparticles crisis on global warming and the mortality rate of fish cumulative effect this means that if the amount of exposure to nanoparticles is critical to global warming exceeded is added.

If the rate of diffusion of nanoparticles is critical also exceeded the mortality rate of fish close to the release added. The rate of release critical nanoparticles on soil quality and water near the site of the release of negative effects this means that if the rate of diffusion of nanoparticles is critically exceeded water quality and reduce soil.

Frequently caused by the publication of critical nanoparticles butadiene (RA) under the headings inappropriate responses health-environment, frequently economic and social responses in approximately 43/48% of the total variance of responses caused by the release of nanoparticles are critical.

Table 8. Results of factor analysis of responses to the crisis caused by the release of nanoparticles

OpenBSD	Of % total variance	Percentage of explained variance	Load factor	Items	Agent's name
1	19.04	19.04	0.58	Increased anxiety	Inappropriate responses to environmental health
			0.69	Increased stress	
			0.63	Increase physical ailments such as lung, liver, kidney	
			0.77	Meat contaminated with animal entering the food chain	
			0.64	Crop farming products contaminated as a result of contaminated soil and water	
2	37/66	18/62	0/68	Increased costs of treatment resulting from contaminated foods	Economic responses
			0/70	Non-business revenues arising from the inability of employees in temporary jobs after work	
			0/72	Decreased agricultural production due to low soil quality resulting in farmers' income	
			0/77	An increase in imports due to lower production and paralyzing the economy	
3	48/43	10/77	0/64	Not wanting to employee participation in co-operation with domestic and international research on nanoparticles due to bad health effects of exposure to nanoparticles	Social response
			0/56	Lack of trust in senior technical staff to safety-related workshops and petrochemical plants	
				Reducing the quality of work life of employees and consequently reduced job productivity	

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