

Appraisal of Occupational Health and Safety Practices in Power Holding Company of Nigeria (PHCN) PLC Abuja Distribution Zone

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Abstract

This study was designed specifically to determine the adequacy of the safety equipment and devices, the compliance of occupational health and safety standards and the possible ways of promoting occupational health and safety in Abuja distribution Zone, Nigeria,. The three research questions and one hypothesis were formulated and tested at .05 level of significance. The research designed used for this study was the survey method as it involved the use of questionnaires to elicit opinions from respondents. The study was conducted in Abuja distribution Zone, Nigeria, purposeful sampled techniques was used. 85 technicians and 35 supervisors/engineers and 15 Managers were randomly sample from these stations. The designed questionnaires were administered to the respondents and had 100% returned rate. Four point scales was used. The data collected for this study was analyzed using mean, standard deviation and analysis of variance (ANOVA). The findings emerged from the study among others are inadequate of some safety equipment and devices like Automatic Smoke Detectors, Muffs/Plugs and safety nets and No employee is permitted to work on power equipment alone and not only approved safety belts and straps are worn by linemen. Based on these findings it was recommended among others that the management should provide adequate and relevant safety equipment and devices, ensure strict compliance with OHS standards and establish of OHS department in every station and business unit.

Keywords:- Appraisal, Occupational Health and Safety Practices and Power Holding Company of Nigeria (PHCN)

Introduction

Electricity plays a very important role in the socio- economic and technological development of every nation. Electrical energy occupies the top grade in the energy hierarchy and the impact of electrical energy can be seen or felt in industries, communications, agriculture, medical services and other place. Electricity is one single scientific invention that has completely transformed the entire world from primitive world to a modern and sophisticated one. Recognizing that power supply is the engine room of any viable

economic activity (Gupta, 2006). the National Electrical Power Authority of Nigeria (NEPA) was established by decree, No 2 of April, 1972 which resulted in the merger of the Electricity Corporation of Nigeria (ECN) and the Niger Dams Authority (NDA) and it has now metamorphosed to Power Holding Company of Nigeria (PCHN) it was given mandate to maintain and coordinate an economic and efficient system of generation, transmission and distribution of electricity to all part of the country and beyond. When one considers the strategic position that the PHCN occupies in the nation's economy vise-avid the appalling and continued loss to her skilled manpower

through death and incapacitation while at work, it is crystal clear that the mandate given to the company is been threatened (Esan, 1998).

The work environment is undergoing a rapid transformation with the introduction of new technologist and automation in industries. The chemicals, equipment and machineries used in either production or service industries bring varying degrees of hazards which threaten the health and safety of the workers. The rate of work related accidents and diseases are particularly worrisome in developing countries that call a serious attention into safety and health practices. Safety is been defined as the practical certainty that injury will not result from the used of substance or agent, equipment and machines under specified condition or quality and manner of use. Safety and health culture within a company is closely linked to the workforce's attitudes in respect to safety. Building a safety culture on so many diversities is not an easy task. But it had been proven that companies with good safety and health cultures have employees with positive patterns of attitude towards safety and health practices Ahmadon, Rosli, Mohd., & Abdul, (2006). Glendon, and McKenna, (1995) Stated that occupational health is considered to be multidisciplinary activity aiming at:

1. protection and promotion of the health of workers by preventing and controlling occupational diseases and accidents and by eliminating occupational factors and conditions hazardous to health and safety at work
2. Development and promotion of healthy and safe work, work environments and work organizations.
3. enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work
4. Enablement of workers to conduct socially and economically productive

lives and to contribute positively to sustainable development.

Okorie, (2001) reported that no matter the amount of sophisticated tools, equipment and machines an industrial firm may possess, efficient operations and reasonable profits in such firm will depend largely on the quality of its workers. In other words, production will be efficient to the degree that the workers in the production line are physically and psychologically disposed to perform their production roles. It follows, therefore that safety and health of an employee should be of paramount concern to his or her employers. ILO (2005) observed that many developing countries are experiencing an increase in occupational accidents and diseases as a result of rapid industrialization and they require the reinforcement of national prevention effort. The worldwide fatality level from work related injuries and diseases amounts to about 2 million annually. While annual rates of such injuries and diseases are declining slowly in most industrialized countries. The overall annual rates of occupational fatal and non-fatal accidents are estimated at about 270 million and some 160 million suffers from work related diseases.

Geoffrey, Kellie & Roy (2004) stated that when electrical equipment is being used, if system faults occur electrical energy can severely injure or kill a person who is in contact with a live conductor. The danger is not apparent in the size of equipment, as a small hand-held electrical device can be just as damaging as industrial equipment, if faulty. It has been found through experience that the following current magnitudes are likely to affect a recipient in the way shown if contact is made with a live conductor: 1–3mA generally cannot be felt; 10–15mA difficult to let go or be pushed away; 25–30mA contraction of chest muscles is affected, resulting in heart fluttering and an inability of the heart to pump blood effectively. These levels must not be taken as more than indicative. Other possible effects from shock include burns (contact, arc, radiation, and

vaporized metal), arc eye and other injuries resulting from a fall. Faulty electrical equipment can result in fires and explosions. When a short circuit occurs on any system, the resulting current is limited only by the electrical constraints of the system (including the fault) and can reach a value as high as 20 times the normal load current for the plant item concerned. Thus, in many cases, conditions at the fault are rather like the explosion of a bomb. Metals melt and very hot gases are liberated, often in a small confined space, so that there is a great risk of damage and injury to persons. Electrical equipment which has the possibility of generating heat, or sparking with use, requires special consideration. The prime objective of electrical safety is to protect people from electric shock, and also from fire and burns arising from contact with electricity. Two basic preventative measures against electric shock are:

1. Protection against direct contact, for example by providing proper insulation for parts of equipment liable to be charged with electricity.

2. Protection against indirect contact, for example by providing effective earthing for metallic enclosures which are liable to be charged with electricity if the basic insulation fails for any reason.

Glendon, and McKenna, (1995). State the advantages of implementing an occupational health and safety management system are:

1. A safer workplace: An Occupational Health and safety Management system enables the organization to identify hazards, assess risks and place the necessary risk control measures in place to prevent accidents.
2. Moral: Implementing an Occupational Health and Safety Management system shows a clear commitment to the safety of the organization staff and can contribute to a more motivated, efficient and productive workforce
3. Reduced costs: Fewer accidents mean less expensive downtime for any

organization. Besides the Occupational Health and Safety Management system improves the insurance liability ruling

4. Training: An Occupational Health and Safety Management system highlights whether or not the employees in any organization are competent for the task they are performing, which impacts in training and teamwork.
5. Monitoring: The regular assessment process will help in continually monitor and improve the Health & Safety performance
6. Integrated: The safety management system can be easily integrated with other management systems
7. Stakeholders' confidence: An independently assessed Safety management system tells to the organization stakeholders that the organization itself has met a number of legal and regulatory requirements, giving stakeholders confidence in the organization.

The related economic costs due to compensation, medical expenses and the like are estimated routinely to amount to 4 percent of annual global GDP. Oke (2002) lamented to the fact that about 17,000 workers are killed every year, over 2,000,000 workers received injuries, while 300,000 workers are permanently impaired. The trend of injuries and diseases from work environment is particularly frightening in developing countries such as ours because of the absence of reasonable research into economic implications of occupational accidents occasioned by epileptic accident reports.

Any time there is an accident, it is an indication that somebody somewhere has failed to do what he is supposed to do (Essiet, 2005). Black (1977) shared similar opinion that whatever explanation given for an accident, the truth is likely to be a failure to think ahead. Accident process can therefore be thought of as a sequence of actions or occurrence during which for some needed adjustment in attitude, behaviour or

environmental condition, there is an increasing likelihood of an unplanned incident. Accidents produce both economic and social loss. Impair or disrupt individual or group productivity and retard the advancement of standards of living. It is certain that accidents cripple both industry and society and there is, therefore need to direct much effort toward the elimination or at least minimization of accidents in our industries.

Statement of the problem

A general truth in industrial plants as 'safety first' the right way to do a job is the safety way and he or she that works safety today lives to work another day. This is pointing directly to the need of safety in industrial operations. It also point indirectly to the consequences of industrial accidents. A part from war industrial accidents can be regarded as one of the scourges of modern industrial societies (Okorie, 2001). Arosanyin (1998) lamented that death and injury keep people out of life and work permanently and temperately as the case may be. Consequently the vital contribution of these groups of victims to economy in terms of output is lost. He further stated that apart from the output forgone, the economy suffers from replacement costs which include medical treatment of accident victims, replacement of the damage equipment, man-hour loss and compensation claims. Essiet (2005) shared similar view about economic implications of occupational accident, according to him the cost of rehabilitating the injured and paying compensation in case of death.

Above all, high accident rates jeopardize the image of an organization. Sequel to this, the study was designed to investigated the unsafe acts and conditions in the work place that are potential threats to the workers in PHCN with a view to proffering solutions to the menace of incessant loss of her skilled manpower through death and disability.

Research Questions

The following questions were asked to guide the study:

1. How adequate are the safety equipment and devices in Abuja distribution zone Nigeria?
2. How compliance is occupational health and safety standards in Abuja distribution zone Nigeria?
3. What are the possible ways of promoting occupational health and safety in Abuja distribution zone Nigeria?

Hypotheses

The following null hypotheses were formulated at $p < .05$

4. There is no significant difference between the mean responses of Technicians, Supervisors/Engineers and Mangers as regards extend of compliance with occupational health and safety standards in Abuja distribution zone Nigeria.

Materials/Methods

The research designed used for this study was the survey method as it involved the use of questionnaires to elicit opinions from respondents. The study was conducted in Abuja distribution zone Nigeria. Niger state and Abuja was sampled using Purposeful sampling techniques, 85 technicians and 35 supervisors/engineers and 15 Managers were randomly sample from these stations. The designed questionnaires were administered to the respondents and had 100% returned rate. Four point scales was used of strongly agreed, agreed, disagreed and strongly disagreed.

The data collected for this study was analyzed using mean, standard deviation and analysis of variance (ANOVA). To determine agreed and disagreed, the resulting mean scores was interpreted relative to the concept of the real lower and upper limits of numbers 1-4 as used

on the rating scale adopted for the study. The decision point between the upper limit of 3 and lower limit of 2 being 2.49 and 2.50 respectively, this mean that items with mean values of 2.50 and above were considered as agreed while items with values of 2.49 and below were considered as disagreed. For testing hypotheses at .05 level of significance, t value of 1.98 was selected any item that had it calculated value less or equal to the t value was considered non-significant and less was considered significance

Research Question 1

1. How adequate are the safety equipment and devices in Abuja distribution zone Nigeria?

Table 1 Mean of technicians, engineers and supervisors on adequacy of the safety equipment and devices in Abuja distribution zone Nigeria.

$N_1 = 85, N_2 = 35, N_3 = 15$

S/No	ITEM	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_t	Remarks
1	Fire Extinguishers	3.42	3.20	3.12	3.25	Adequate
2	Potential Test Indicators	3.23	3.20	3.36	3.26	Adequate
3	Grounding Devices	2.98	3.02	3.26	3.09	Adequate
4	Respirators	2.46	2.32	2.08	2.29	Not Adequate
5	Fault Alarms	2.36	2.46	2.30	2.38	Not Adequate
6	Safety Hats	3.45	3.27	3.65	3.47	Adequate
7	Safety Boots	3.54	3.21	3.33	3.36	Adequate
8	Automatic Smoke Detectors	2.06	2.40	2.24	2.24	Not Adequate
9	Hydrant Systems	2.06	2.41	2.42	2.30	Not Adequate
10	Hand Gloves	3.96	3.05	3.32	3.44	Adequate
11	Fuse Pullers	3.02	3.14	3.27	3.10	Adequate
12	First aid Equipment and Materials	3.20	3.00	3.16	3.12	Adequate
13	Safety Glasses	3.46	3.05	3.34	3.28	Adequate
14	Muffs/Plugs	2.07	2.11	2.48	2.22	Not Adequate
15	Body Hardness	2.08	2.42	2.90	2.33	Not Adequate
16	Safety Belts	2.82	2.75	2.90	2.82	Adequate
17	Safety Nets	2.02	1.89	2.11	2.01	Not Adequate

Keys: N_1 = Number of technicians, N_2 = Number of Engineers, N_3 = Managers X_1 = Mean of Technicians, X_2 = Mean of Engineers, X_3 Mean of Managers X_{av} = Average mean.

Table 1. Revealed that the respondents judged some equipment and devices to be adequate and respirators, automatic smoke detectors, muffs/plugs and body hardness were considered inadequate.

Research Question 2

What extend of compliance with occupational health and safety standards in PHCN work environment?

Table 2. Mean responses of technicians, supervisors/engineers and managers on the extent of compliance occupational health and safety standards in PHCN work environment.

$N_1 = 85, N_2 = 35, N_3 = 15$

S/No	ITEM	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_t	Remarks
1.	Compartments such as control rooms are adequately illuminated	3.62	3.42	3.14	3.40	Agreed
2	Functional fire extinguishers are placed in where fire outbreak is most probable.	3.41	3.30	3.26	3.32	Agreed
3	The fire extinguishers are clearly marked.	3.32	3.11	3.04	3.16	Agreed
4	There are proper emergency exits in compartments housing equipment and transformer.	3.03	3.21	3.41	3.22	Agreed
5	Caution/prohibition tags are displayed on equipment that must not be operated.	3.67	3.54	3.49	3.53	Agreed
6	Protective wears are properly worn when carried out the work.	3.46	3.40	2.54	3.13	Agreed
7	Only approved safety belts and straps are worn by linemen.	2.41	2.46	2.51	2.46	Disagreed
8	Approved switch sticks or clamp sticks of sufficient length are used.	2.32	2.14	2.36	2.27	Disagreed
9	Dry woods are used for protective temporary barriers.	3.82	3.76	3.58	3.72	Agreed
10	No employee is permitted to work on power equipment alone.	3.01	3.23	3.96	3.07	Agreed
11	Approved fuse pullers are used to place or removed cartridge type fuses	2.11	2.08	2.51	2.23	Disagreed

The Table 2. Shows that the respondents agreed on the majority of the items raised and they disagreed with item 20 and 24, having the mean point below 2.50. This signified that those items are not properly complied with.

Research Question 3

What are the possible ways of promoting occupational health and safety standards in PHCN work environment?

Table 3. Mean responses of technicians, supervisors/engineers and managers on the possible ways of promoting occupational health and safety standards in PHCN work environment.

$N_1 = 85, N_2 = 35, N_3 = 15$

S/No	ITEM	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_t	Remarks
1	Organizing seminars and workshops on safety on regular basis.	3.82	3.14	3.06	3.34	Agreed
2	Organizing a mandatory induction course on safety for every new staff upon employment.	3.94	3.62	3.56	3.71	Agreed
3	Provision of protective equipment such as safety hats, shoes, hand gloves etc. for workers.	3.52	3.04	3.08	3.21	Agreed
4	Keeping walkways and doors clear	3.89	3.54	3.62	3.68	Agreed

5	Conducting relevant test on power equipment to confirm isolation/outage before any operation is carried out.	3.80	3.62	3.58	3.67	Agreed
6	De-energizing power equipment and apparatus which are capable of storing charges while testing/working on them.	3.74	3.31	3.21	3.42	Agreed
7	Prohibiting inexperience workmen from working near live equipment/ power lines involving very high voltage.	3.04	3.81	3.68	3.51	Agreed
8	Workers should be trained to improve their practical skills.	3.74	3.41	3.38	3.51	Agreed
9	Staff are provided with needed facilities when need arises.	3.56	3.11	3.47	3.38	Agreed
10	Workmen prohibited from making and receiving calls while working on a pole or where sensitive operations are involved.	3.68	3.41	3.59	3.56	Agreed
11	Supervisors should enforce strict compliance with safety rules and regulations.	3.72	3.34	3.41	3.57	Agreed
12	Promptly reported and documented all accidents, whether major, minor.	3.52	3.41	3.28	3.51	Agreed
13	Encouragement of maintenance culture for equipment and machineries.	3.56	3.24	3.18	3.33	Agreed
14	A health and safety day should be declared in the company annually to create safety consciousness among the workers.	3.66	3.64	3.52	3.61	Agreed
15	Establishment of occupational health and safety department in every business unit.	3.41	3.32	3.92	3.55	Agreed

The Table 3. Shows that the respondents agreed with all the items raised as the possible ways for promoting occupational health and safety standards in PHCN work environment.

Hypothesis

H₀₁ There is no significant difference between the mean responses of Technicians, Supervisors/Engineers and Managers as regards extent of compliance with occupational health and safety standards in in Abuja distribution zone Nigeria.

Table 4: One-way Analysis of Variance of the Mean Responses of Respondents on extent of compliance with occupational health and safety standards in in Abuja distribution zone Nigeria.

Source of Variation	Sum of Squares	df	Mean Squares	f-cal	f-critical	Decision
Between groups	0.01268	2	0.00634			
Within groups	349.83	132	0.69	0.0092	3.42	NS*
Total	348.50	134				

* Not Significant

The result of analysis as presented in Table 4 shows that there was no significant different ($P > .05$) in the mean responses of Technicians, Supervisors/Engineers and Managers as regards extend of compliance with occupational health and safety standards in Electrical generation, transmission and distribution stations in Niger State. Thus, the null hypothesis was not rejected

Discussion of Findings

This study is designed to investigate the current status of occupational safety in power holding of Nigeria (PHCN) with a view evolving ways of forestalling loss of skilled man power through death and incapacitation as a result of occupational accidents. This led to the formulation of four research questions and two null hypotheses which the study sought to answer and confirm. The discussion of findings was organized and presented in order of the research questions and the hypotheses.

This research question was formulated in order to investigate the availability or otherwise of basic safety equipment and devices in PHCN. Consequently, 17 questionnaire items were generated to elicit responses from technicians and supervisors/engineers. The findings contained in Table 1 revealed that equipment such as fire extinguishers, safety belt, hand gloves, safety boots/foot wears, and potential test indicators were, available in the business units. Whereas devices such as fuse pullers/carriers, respirators goggles, and first-aid boxes were not available. The non-availability of these basic safety equipment and devices was thus, one of the major accident causations in the power industry. This finding is consistent with the earlier report of Oke (2002) in a similar study that lack of adequate safety devices in the design of machines, or non-provision of safety equipment constitute technical equipment hazards which can lead to accidents.

Obviously then, when workers are not equipped with relevant safety devices, the next option is to make do with the available alternative which in most cases, makes the work personnel more susceptible to accident that may range from impairment in the use of eye, leg, hand or death in extreme cases. On the extent of compliance with OHS standards,

it was revealed that certain OHS standards with respect to the use of appropriate equipment and protective wears were being flouted by the workmen. The use of pliers to insert or pull fuses from the feeder pillar which was the usual practice by PHCN staff negates the approved OHS standards (Caborn, 2005).

This harmonizes with Essiet (2005) who reported that high rate of accidents in the zone have been traced to violation of standard safety code of practice. This goes to say that accidents do not just occur in isolation without somebody or something responsible for their causation. Most accidents which could have otherwise been averted or prevented are thus, caused by human actions or inactions.

On the extent of safety enlightenment activities in PHCN, it was revealed that technicians and supervisors/engineers agreed that seminars/workshop on safety were organized and attended on regular basis by PHCN staff. Both group of respondents also agreed that every staff underwent an induction course on safety upon employment. The technician however, disagreed that they were not trained on how to administer first aid treatment. This singular indication has faulted the level of safety enlightenment in the zone. It is a well-known fact that timely or otherwise administration of first-aid treatment often spells the difference between life and death of an accident victim. No amount of money should be considered too great in committing to safety education and equipping of first-aid boxes. Every dollar, according to Barber and Donovan (1988) intelligently spent on safety always return big dividends. The need for adequate training and retraining of workers on safety can therefore, not be overemphasized particularly when new processes and procedures are been introduced.

Findings of research question 4 which were drawn to elicit responses from technicians and supervisors/engineers on possible ways of promoting occupational safety in PHCN. The

result revealed among others, that organizing seminars/workshops on safety rules and regulations, training of workers in potential hazard recognition, enforcing strict compliance with OHS standards, and improving the practical skills of workers through training and retraining are veritable tools for enhancing occupational safety in the power industry.

Success in preventing needless accidents and their attendant personal injuries require neither a complicated system of policing and controls nor involve in-depth scientific knowledge. Rather, it demands a reasonable degree of safety consciousness through the principle of responsible care and a committed attitude of mind to safety (Essiet, 2005). A successful occupational health and safety practice therefore, requires the tripartite responsibilities of the government, employers and the employees in safety programs. If accident process is thought of as a sequence of actions rather than a spontaneous occurrence, the onus then lies in the hands of every stakeholder in the power industry to be actively involved in hunting potential hazards in the work environment.

Conclusion

Occupational health and safety (OHS) standards as it were presently in PHCN needs improvement and expansion in its coverage to the business unit levels. There were no basic safety equipment and devices in the business units. Relevant OHS standards relating to the right use of tools and protective wears were not complied with. From the foregoing discussion, the researcher gave some recommendations that will promote not only greater ergonomics for workers but also enhance the corporate image of the pioneering power industry in Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Comprehensive seminars and workshops on occupational health and safety should be organized for all cadres of technical staff on regular basis so as to create safety consciousness and sense of

responsibility in every work personnel.

2. Relevant and adequate personal protective wears and equipment should be provided for all staff that is deemed exposed to hazards at work. These should be routinely checked by the foremen/supervisors.
3. Workmen who are found of flouting approved safety rules and regulations should be warned verbally and by writing. If such practices persisted, appropriate punitive measures should be meted out.
4. Adequate attention should be given to training of workers in potential hazard recognition. As it is always said, prevention is better than cure.
5. Supervisors should ensure that workmen always comply with the approved OHS standards with particular reference to personal protective wears and safe work habits.
6. A functional occupational health and safety department should be established in every business unit. This will no doubt, bring the campaign against occupational accidents and diseases closer to the people.
7. Since the business of safety is neither an entity separate from production or service delivery, nor an exclusive of few safety specialists, all accident prevention programs should be considered as being part of the production process.

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