Occupational Safety and Health Management in the Production of Electricity Transformers at Zesa Enterprises, Harare

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Abstract:- **The aim of this study was to assess the effectiveness of occupational safety and health management systems in accident prevention at ZESA enterprises in Zimbabwe. Questionnaires, interviews, observations and document review were used as data collection tools. The most common hazards identified at ZESA included improper work organization, poor hygiene, ergonomic hazards, fire, and electric hazards. Since the introduction of the occupational safety and health management system in 2009, the work environment became safer and there was a decline in the number of accidents recorded each year thereafter. The existing occupational health and safety management system at ZESA enterprises met the majority of the requirements outlined in the OHSAS 18001 specification. It was concluded that implementation of the occupational safety and health management system whether or not following international standards always yielded positive results in improving occupational safety and health performance.**

Key words: **Occupational safety and health, electricity, transformers, OHSAS 18001, hazards**

I. INTRODUCTION

Economic meltdown in Zimbabwe has resulted in poor performance of local companies at international markets resulting in low profit making. This has contributed to failure by the majority of companies to implement internationally recognised occupational health and safety management systems such as the OHSAS 18001, an standard which premises on hazard identification, workplace assessment and risk control aiming at eliminating work related hazards (Benjamin, 2001; Hope, 2012). In other words, the ability of employers to fully invest in issues relating to health and safety were compromised by the state of the economy over the past years, which culminated in utility inefficiencies. OHSAS 18001 outlines the major aspects for ensuring that the work activities are safe and no accident should be witnessed at the work place.

According to Zimbabwe's National Social Security Authority (NSSA)'s, national report a review of the safety and health national performance in the year 2007 revealed that there were 6 117 serious occupational injuries of which 72 were fatalities. In 2008 there were 3 810 serious injuries with 65 fatalities and 3 122 serious accidents and 64 fatalities were experienced in 2009. In 2010 there were 4 410 serious injuries 90 of which were fatalities while the year 2011 recorded 4 111 serious injuries with 75death (NSSA, 2010). The year 2012 recorded 7 017 serious injuries and 53 fatalities. As a result of these fatal accidents, the process of enacting a new and integrated law on occupational health and safety began. Very little progress had been made in improving industrial standards on safety, health and environment and it has been hoped that OHSAS 18001 certification would enable organizations to manage operational health and safety risks and improve performance.

The OHSAS standard together with NSSA regulations would put organizations under pressure to comply hence the need for them to be proactive and seek for codes of practice, set of rules and formula that grant immunity from prosecution and heavy penalization for non-compliance. ZESA Enterprises has invested millions of dollars in ensuring a safe and healthy working environment for its employees. The occupational health and safety standard was regarded as a panacea to the work related health and safety hazards and risks. However, the extent to which the investments have gone in raising the occupational safety and health standards to international levels has not been assessed. A detailed study is essential to justify the projects already implemented and pave the way for future initiatives.

II. LITERATURE REVIEW

Occupational safety and health management systems protect the safety, health, and welfare of people at the workplace. All occupational health and safety programs aim to foster a safe work environment, including the protection of employers, suppliers, customers, family members, nearby communities, and other members of the public who could be affected by a company's operations, (Alexander and Michael, 1998; Alsop and Le Couteur, 1999; Bernhard and Gabriele, 2012; Feresu, 2012; NSSA,2012). Such programs draw on disciplines such as occupational medicine, occupational or industrial hygiene, public health, safety engineering, chemistry, health physics, ergonomics, toxicology, epidemiology, and environmental health.

Since 1950, the International Labour Organization (ILO) and the World Health Organization (WHO) have shared a common definition of occupational safety and health. It was adopted by the Joint ILO/WHO Committee on Occupational Health at its first session in 1950 and revised at its twelfth session in 1995. According to the ILO "Occupational health and safety should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health and safety; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and to summarize, the adaptation of work to man and of each man to his job, (ILO, 2009)."

Caborn (2005) noted that the main focus in Occupational Health and Safety is on three different objectives which are, the maintenance and promotion of workers' health, safety and working capacity; the improvement of working environment and work to become conducive to safety and health and development of work organizations and working cultures in a direction which supports health and safety at work. In doing so, it promotes a positive social climate and smooth operation and may enhance productivity of the undertakings. The concept of working culture is intended in this context to mean a reflection of the essential value systems adopted by the undertaking concerned. Such a culture is reflected in practice in the managerial systems, personnel policy, principles for participation, training policies and quality management of the undertaking.

Occupational health and safety at work place has become a worldwide concern with the International Labour Organization setting standards to be met with organizations to protect its employees from working environment hazards (ILO, 2009; Hope, 2012). Some nations have gone a long way in protecting workers from working in hazards, however, the extent to which the investments have gone in raising the occupational safety and health standards to international levels in each economic sector is not known. According to Lynda (2006), Awwad (2001), Kaj (2012) and Bennett (2002) in order to ensure that satisfactory and durable results are achieved in the field of occupational health and safety, each country should put in place a coherent national policy aimed at preventing accidents, diseases and injury to health which arise out of, are linked with, or occur during the course of work. By striving to minimize the causes of hazards inherent in the working environment, the policy could reduce the costs associated with work-related injury and disease, contribute to the improvement of working conditions and the working environment, and improve productivity. To reduce workplace hazards, Western Australia passed the Occupational Safety and Healthy Act in 1984, which provides for the promotion, coordination, administration and enforcement of occupational Safety and Health. Gallagher, *et al*. (2003) noted that the Act placed certain duties on employers, employees, self-employed people, manufactures, designers and supplies and emphasised the prevention of accidents and injuries at the workplace.

According to Idris (2008), Malaysia put special emphasis on occupational safety and health issues due to its rapid economic development. There is a growing concern about safety and health at work. Until 1994, Malaysia did not have adequate provisions to ensure safety and health of employees at the workplace. There was only the traditional legislation meant for technical aspects and it lacked the human aspects of ensuring safe and healthy workplaces. The promulgation of the Occupational Safety and Health Act 1994 made further provisions for securing the safety, health and welfare of any connection with the activities of the person at work. It is based on the concept of self-regulation whereby it placed certain duties on employers, employees, self-employed persons, manufacturers, designers and suppliers. It also placed emphasis on the prevention of accidents, ill health and injury. This is the main Act which helped to reduce occupational incidents and accidents in the Malaysia.

The OHSAS 18001standard is the most widely recognized Occupational Health &Safety Management System standard globally. According to Bakri (2006) and Thomas (2012), this structured management systems approach enables organizations to identify hazards, assess and prioritize risks, and implement appropriate protective and preventive control measures to reduce the potential for occupational injuries, illnesses and fatalities. OHSAS 18001can be defined as an Occupation Health and Safety Assessment Series for health and safety management systems, (ILO, 2009). It aims to help organizations control occupational health and safety risks. It was developed in response to widespread demand for a recognized standard against which to be certified and assessed.

III. METHODOLOGY

A detailed analytical study was undertaken at ZESA generator manufacturing plant in Harare. Focus was on the ZESA enterprises in Ardbennie electricity generator producer in Zimbabwe and the pioneer in implementing the OHSAS standard. Total population sampling was employed (saturation sampling) and hence a total of 250 questionnaires were self-administered and directed at all the 75 employees in the electrical sector, and all the 75 in the pole sector and 100 in the mechanical section. The questionnaire surveys aimed at generating information on the levels of understanding of the occupational safety and health policy, fire protection and guarding of prohibited areas, audits, emergency procedures, energy conservation, safety training and loss prevention programmes. Validation of the questionnaires was done through undertaking a pilot survey before administering them. The questions also included open ended ones to effectively capture the perceptions, thoughts and feelings of the respondents pertaining to the research questions. Closed ended questions ensured that the respondents were confined

within the aspects pertaining to the objectives of the study. The questionnaire responses were modelled on the nominal scale to capture frequencies or categorical aspects, on the ordinal scale to emphasise the magnitudes of occupational hazards and on the interval scale to relate to parametric data and the numbers affected by certain aspects relating to OHSA 18001. Key respondents for interviews included officials at NSSA (focusing on the heads of the Factories Inspectorate, ZOHSC, Health Services and Research Units), the company's safety manager and safety officers, supervisors, quality management officer and engineering manager as well as the head of the Engineers' Association of Zimbabwe were interviewed with regard to the effective implementation of the OHSAS 18001standard in the electricity generator production company. These were purposively chosen based on the informant's knowledge of key issues in safety and health management in the electricity sector. Secondary data sources involved a review of policies and legislation governing occupational safety and health in Zimbabwe. These included the Factories Works Act, the NSSA Act, the Pneumoconiosis Act, the Public Health Act, Environmental Management Act, the Electricity Act and the Mines and Minerals Act. Accident records were also analysed as they provided information on the types of accidents and their causes as well as the accident frequency rates. Observations were undertaken on hazard identification and risk assessment, unsafe behaviours, floors and housekeeping, safety posters, notices and signs, positions of assembly points, conditions of evacuation zones, fire extinguishers and fire alarms, inspections of buildings, machinery, equipment and plant for compliance to OHSAS 18001 management systems. Data analysis was undertaken using SPSS for parametric and non parametric tests such as ANOVA, correlation and Chi-square tests.

IV. RESULTS AND DISCUSSION

Occupational health and safety hazards associated with transformer manufacturing

Several hazards associated with the production of electricity generators were identified at ZESA enterprises as shown in Table 1.

Table 1: Occupational hazards at ZESA Enterprise manufacturing division

Types of Hazards	Hazard	Impact
Physical hazards	Electricity	Death, general injuries to the body, electrocution
	Noise; Slips; Trips; Falls	Damage to the ear; Cause accidents due to communication brake down and injuries.
Mechanical hazards	Opening of the floor; Falling objects; Unguided moving parts eg shock lifts bad house-keeping like poor ventilation and dirty toilets poor materials of PPE	Sickness leading to spread of diseases.
	welding	Eye damage; Skin injuries, burns
Chemical Hazards	Liquid fluids; Solvent used to dissolve grease; Oil paints Glue; Fire; Explosions; Leaks; Spill; Fumes and vapour.	Damage to the skin especial acid, Damage to property.
Biological Hazards	Bacterial ;Viruses;Fungi	Sickness.
Ergonomic	Poor work station; Physically heavy work; Poor working postures; Wrong working methods.	Sickness.
Psychosocial	Stress	Fatigue, Social and domestic instability; Violence and sickness.

Some of the hazards shown in Table 1 are too scientific to be realized by unprofessional employees. According to Marata (2005), effective implementation of safety systems would lead to reduced risks. Most employees are affected by the physical hazards. The electrical department is associated with the largest number of hazards compared to pole plant and mechanical sections. This implies that there is need to develop a hazard identification checklist and training program (clause 4.3.2 of OHSAS 18001) to assist workers to be able to identify hazards as a way of creating a hazard free working environment.

Slips, falls, noise, fire, vibration and electricity are examples of physical hazards experienced at ZESA enterprises. Mechanical hazards where mainly identified in all departments. The hazards range from openings in the floor, falling objects, unguided moving parts such as shock lifts, bad house-keeping like poor ventilation and dirty toilets poor materials of PPE. Chemicals pose accidents and incidents to the workers who come in contact with them. Most of the chemical hazards were found to be more dominant in the pole plant section where they are used to treat poles. Chemical hazards are mainly associated with the pole plant section and these include liquid fluids and solvents used to dissolve grease, oil paints and glue. Fires, explosions, leaks, spills, and exposure to gases, vapours, mists, and fumes are also common chemical risks. The biological hazards range from bacteria, viruses and fungi.

There are also many ergonomic hazards associated with the company operations. These range from poor work station, physically heavy work, poor working postures and wrong working methods. These were mainly identified at the pole plant section which involves the lifting of pole and hence muscular-skeletal problems resulting from repetitive activities such as lifting of poles in pole plant section, and carrying, or from spending long periods in one single position such as sitting at desks and working with computers in offices, are typical ergonomic hazards. Psychosocial hazards such as stress affect all workers at the industry and are attributed to low wages and at times lack off shifts.

The effectiveness of the health and safety management system at ZESA enterprises

Effective implementation of safety system programmes enables a sound working environment with minimal risks (Benjamin (2008). Various OHSAS 18001 safety programmes are being implemented at the organization and these include orientation, hazard identification, training, ergonomics drills, electricity safety, fire control and first aid. About 1, 76% of the responds indicated that the company performs orientation to both workers and visitors. This means that up to 29% of the respondents said no, the company does not do orientation since they revealed that they were not given induction specifically on hazards at the plant. The interview with the production manager revealed that the company performs induction using the guide check list. Forty eight percent of the respondents indicated that the company performs the hazard identification and 52% of the respondents noted that the company does not perform hazard identification. From the questionnaires administered 40% of the respondents indicated that they knew their SHE representative and 60 % of the respondents do not agree. These revealed that there were no contact numbers of their representatives in the plant notice board. However, according to the production manager there are SHE representatives in each section and this was evidenced by list of names of representatives found in company documentation which the researcher reviewed. However, on the ground, there were no SHE representatives in each section and this only documented.

Despite the high response on orientation, high numbers of accidents are still being recorded and this may be due to inadequate training of workers on the hazards. Thirty six percent of the workers indicated that training is done for all workers. However, 64% of the respondents indicated that they did not receive any training. Even though the interview with the engineer revealed that training is done on machine operators and the use of PPE and hazard identification, observations revealed that the majority of workers did not know how to use simple hand tools and others actual removed the PPE when performing tasks. According to Benjamin (2008), low training levels of workers makes them not aware of the importance of PPE but rather view PPE as uniforms not protective clothing.

Fifty two percent of the employees indicated that they are aware of electrical safety programme which outline safe work practise that are to be followed to prevent electricity injuries to workers and property damage. According to the Quality officer, electrical safety programme runs parallel with the fire programme. This is probably because of the risk of fire which usually affects the company. In this study 28% of the respondents revealed that they were aware of the first aid programme. Employees revealed that there are first are workers who have been trained to undertake first aid. However 72% did not even know the existence of a first aider. According to NSSA (2010) the kind of operation ZESA has, should have a trained first aider by RED CROSS or NSSA but the truth on the ground revealed that the first aider was appointed by the SHE officer. This was noted in the interview with the SHE officer who revealed the he appoints first aider. Results of the analysis of OHSAS 18001 programmes implemented by the company confirm the claims by Lynda et al (2006) that an organization does not fully implement OHSAS 18001 to international levels mainly because OHSAS 18001 is not mandatory and it is not legally supported. In addition the study findings confirm the claims by ILO (2009) who ascertained that implementation of OHSAS 18001 effectively is expensive, it require resource for training, provision of PPE, audits.

Company accident record

Occupational safety and health performance data in terms of total number of accidents was obtained from the company documents and trended to establish whether there was indeed an improvement in the organisation's safety performance before and after the implantation. A decrease in the number of accidents in each year since 2009 could be used to assess the level of effectiveness of the policy. Since the inception of the occupational health and safety policy in 2009, occupational hazards have decreased at the electricity company. As shown in Figure 3, a sharp decline in number accidents from 2009 January to March 2013 was recorded with the lowest record in 2011 which recorded 20. This could be attributed to the positive impact of implementing management systems. However, there are some hazards being recorded each year. The re-occurring of hazards at ZESA enterprises are evident that the safety systems are not fully implemented. Since 2009, there are incidents and accidents recorded and this means that the company is not fully implementing the OHSAS 18001 safety systems to create a safe workplace. Workplace incidents cause enormous amounts of physical, financial and emotional hardship for individual workers and their families.

Gap Analysis between OHSAS 18001 and the existing ZESA Enterprises system

The general requirement of OHSAS 18001 is that the organisations are required to establish, document, maintain and continual improvement of Occupational Safety and Health Management systems. The company has developed an Integrated Safety, Health, Environment and Quality Management System referred to as the Integrated Management System (IMS). The Safety, Health and Environment component of the IMS comprises 27 elements which are further sub divided into 84 sub-elements. This means that the company has fully implemented this clause.

The requirement of OHSAS 18001 is that the OHS policy should be authorised by the top management and shall be appropriate to the nature and scale of the organisation's OHS risks. The organisation's top management have to set aside resources and stating the organisation's OHS objectives and its commitment to continual improvement of the policy. The policy must be communicated to stakeholders and reviewed regularly. More so the policy should be communicated to all

employees and available to the public. From the research revealed that the policy which is printed and posted around the offices, workshops, and plant was signed by the General Manager of the company as a sign of top management's commitment to providing and maintaining safe and healthy working environments for the employees. The policy is reviewed after every two years. Amongst other commitments, the organisation is committed to paying attention to the impacts company operations on the working environment and compliance to relevant legislation on occupational safety and health with particular reference to Factories and Works Act. There has been effective implementation on this clause.

Clause 4.3.1 of OHSAS 18001 notes that organisations need to have procedures for risk assessments and risk control and use the output from these procedures in setting OHS objectives. Methods for hazard identification and risk assessment should be practical, provide for classification of risk and identification and provide for monitoring for required actions. From this research at ZESA enterprises, valid hazards that have been reported by workers are tracked to complete correction. Also employees are involved in the risk assessment process. That is the company involves the employees' reviews on risk assessment. Hence there is effective compliance of this clause.

Another subsection of the clause 4.3 is on Behaviour Based Safety Management. The research revealed that workers have been trained for safe behaviour skills when performing different tasks. The company has trained twenty –two trainee fire fighters in April 2012 by City of Harare Fire Brigade. This was done to reduce the fire accidents.

ZESA enterprises have a copy of the Factories and Works Act (Chapter 14:08) which regulates factory operations around the country. Organisations are required to establish and maintain documented OHS objectives at each relevant and function level and the management programmes required to achieve the objectives. The management programmes must be documented with details of responsibility and time scales, and reviewed regularly. ZESA enterprises set OHS objectives for 2013 and have been put in place based on the roadmap to drive and to achieve best practice standards for all OSH issues. 2013 company objectives and targets were as follows: Lost Time Incidence Ratio- 0.04; Product Cleanliness and Housekeeping- 95%; Safe vs. Unsafe Behaviours- 95%. This revealed that the level of compliance is high and well documented. The organization at the beginning of each year, an OHS improvement plan is structured guided by objectives and it is posted to each section. Procedures in the event of deviation are laid down. Therefore there is no gap between the OHSAS 18001 requirements and the existing policy.

Competent personnel are required to perform tasks that may impact on OHS. When training is used to provide competence, it must take into account the ability and literacy of the trainees and the risk to which they will be exposed. The training should establish and maintain procedure to ensue employees is aware of the importance of conformance to OHS policy and procedure and the requirement of the OHS management system. Every day in the morning employees performs their daily tasks without discussing safety issues. The research also indicated that the organization performs induction to all workers new. All new workers are given induction to the work. Possible hazards and risk associated with the nature of the job are highlighted in the induction and ways to avoid them are also outlined. The SHE officer does the induction. However, refresher induction for permanent staff is not provided. This indicates that the organization does not perform this requirement well. The organization need to pay attention on this subsection of clause 4.4.2 which deals with induction and job safety training.

Organisations must have procedures for communication on OHS issues and documented arrangement for employee involvement and consultation. Employees should be involved in department and review of policies and procedures to manage risks. Also they should be consulted where there are changes that affect workplace health and safety and represented in OHS matters. The study revealed that the organization communicates OSH issues such as accidents which are regulated by the law and they are communicated on time. Hence there is no gap between the OHSAS 18001 requirements on this clause and the existing policy at the company.

There must be a written description of the management system with, as necessary, references to more detailed documentation. It should describe the core elements of the OHS management system and their interactions. The research revealed that documentation such as procedures, work instructions; checklists, etc. are not accessible to general workers. The company also maintain records of accidents, incidents and near misses, inspections records and safety meetings, training, inductions and reports. Other records are: Issue and control of PPE; fire equipment plan layout; fire equipment testing, alarms, extinguishers; emergency evacuation; emergency planning Injury / diseases record and dressing book; injury report and investigations; safety rules, safety working procedures; workshop inspections, training record and work permits. This indicates that the organization comply with the requirement of the OHSAS 18001 clause 4.4.4.

Organisations must identify the potential for, and responses to, incidents and emergency situations. The organisation must also establish plans and procedures for preventing and mitigating the likely illness and injury that may be associated with them. The plans and procedures should review these plans and procedures especially after the occurrence of incidents or emergence situation. The plans must be reviewed and tested where practicable. The organization has an Emergency Preparedness Plan written to cover all emergency situations. Also escape routes from the electrical, mechanical and pole plants are provided, marked, and free from obstructions. However, there is no enough lighting and some

of the signs need to be repainted or replaced with illuminated ones. In addition there are two clearly marked Assembly points in case of emergencies like fire. There is an Evacuation Zone Plan which provides information on where the person is and the route to be followed in case of emergency. However there is need to maintain evacuation zone and repaint the signs or replace signs with illuminated ones.

The organisation is required to establish and maintain procedures to monitor and measure OHS performance on a regular basis. These procedures shall provide for both qualitative and quantitative measures and monitoring of OHS objectives achievement. Also if monitoring of equipment is required, there should establish and maintain procedure for calibration and maintenance of such equipment. The research revealed that safety performance of the organization is measured through: Lost Time Incidence Ratio- 0.04; Product Cleanliness & Housekeeping- 95%, Safe vs. Unsafe Behaviours- 95%. Therefore there is no gap. The company effectively addresses the requirements on this clause.

Organisations must have procedures for investigating accidents, incidents and non-conformances and for ensuring that appropriate corrective and preventive action is taken. Proposed corrective and prevention actions must be the subject of a risk assessment prior to their implementation. The organisation should establish and maintain procedures for defining responsibilities and authority for handling and investigation of accidents, incidents non-conformance. The study revealed that the company records and investigates all accidents, incidents and near misses. The information is recorded in the following ways: Major Accidents; Minor Accidents; Lost time Injury (LTI); Fatality and Accidents 3rd part. Investigations are done on every accident or incident and corrective action is tracked to completion. All incidents resulting in property damage are reported on a designed form and investigated. This means that the organization effectively addresses OHSAS18001 requirement for this clause.

The main purpose of records is to be able to demonstrate conformance with the OHSAS 18001 specification. Records shall be legible, identifiable, and traceable to the activities involved. The organisation has a Records Preservation Schedule which outline the maximum preservation period for each type of OHS record. The SHE department, the following are examples of retention periods apply: Minor Accident Reports- 5 years + C; Serious Accident Reports- 10 years + C; Internal Inspection/ Audit- 5 years + C; External Inspection/ Audit- 5 years + C. Accident records are well kept in the company. Minor injuries as well as illness arising out of work are investigated and a reporting procedure is in place. Therefore there is no gap between the OHSAS 18001 requirements and the company policy. The company effectively addresses OHSAS 18001 requirements for this clause.

Organisations are expected to undertake periodic OHS management system audits which check whether the OHS management system conforms to planned arrangements, is properly implemented and maintained and is effective. The SHE Officer and members of the Fire fighting carry out regular formal inspections of plant equipment from which concerns or non-conformities are raised through Corrective Action Request Form. These audits are done on monthly basis on every Wednesday of mid-week of the month and the following line items form part of the checklist: Floors and walkways are clear of rubbish, materials and equipment; Emergency exits including exit routes are clearly marked and unobstructed; Fire extinguishers are clean, labelled, unobstructed and serviced; Loose tools are kept at their rightful places; There is adequate lighting for the work under taken; Electrical plugs, leads and switches are in good repair; Electrical cords are free from fraying and damage; All electrical switches are labelled; Appropriate Personal Protective Equipment and clothing is used; Safety warnings and signage are in place.

There are some areas that need attention and to be addressed effectively so as to reduce rates of accidents. Top management is required to review the suitability, adequacy and effectiveness of the OHS management system at intervals determined by top management. The review process shall ensure necessary information is collected to allow this evaluation be carried out. The reviews must be document. The organization (ZESA enterprises) policy is reviewed after every (2) two years. However the two years is only on paper not being implemented. Therefore there is a gap between the OSHAS 18001 requirements and company policy. There company needs to address the issues in Clause 4.6.

V. CONCLUSION

Since the introduction of the occupational safety and health management system in 2009, the work environment has become safer and there has been a decline in the number of accidents recorded each year thereafter. The existing occupational health and safety management system at ZESA enterprises met the majority of the requirements outlined in the OHSAS 18001 specification. The implementation of the occupational safety and health management system whether or not following international standards yielded positive results in improving occupational safety and health performance. There are some areas that need attention and other need to be addressed so as to further reduce hazards. There are fundamental safety issues that need to be implemented by both the workers and management in observing and upholding voluntary OHSAS 18001 safety programmes.

A number of hazards dominate the transformer manufacturing industry and these includes electricity, fire, noise, stress, poor work station, welding and poor working postures among others. The majority of the workers are not trained on proper use of PPE and hazard identification and how they can protect themselves from the hazards. New workers are expected to gain and grasp the skills while working without being trained.

This exposes workers to hazards that surround their work place since most people spend about a third of the day at work, meaning that the working environment can have a major impact on their health.

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