



# The Role of Training Employees in Managing Workplace Accident in the Oil and Gas Industry in Rivers State Nigeria

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## Abstract

The study investigated the role of training employees in managing workplace accident in the oil and gas industry in Rivers State, Nigeria. The study used a descriptive research design. Two research questions and two corresponding hypotheses guided the study. The population of the study consisted of 1,400 workers from three contractors who had undergone various accident prevention training in an integrated Oil and Gas projects at remote locations for a client under a single management portfolio. The sample of the study consisted of a total of 155 workers, representing 32% of the population that contributed to the overall man-hours within the projects umbrella using a purposive sampling technique. Two instruments were used to collect data for the study. They include: Evaluation of Application of New Competencies Questionnaire (EANCQ) and Assessment of Training Results Questionnaire (ATRQ). The instruments were subjected to face and content validity by expert in measurement and evaluation, safety training facilitators and industry professionals. The reliability of the instrument were computed using Cronbach alpha and the following reliability coefficients were obtained; 0.83 and 0.78 respectively. The research questions were analyzed using mean and standard deviation, while the hypotheses were tested using One-Way Analysis of Variance (ANOVA). The findings of the study revealed that accident prevention training contributed significantly to the achievement of accident-free operations in the oil and gas industry in Rivers State. Further analysis also showed that participants were able to apply new competencies acquired during the accident training program in managing workplace hazards to prevent accidents to a large extent. Based on the findings, it was recommended among others that company management should embark on periodic evaluation of on-site accident prevention training events in order to determine its effectiveness or otherwise so as to achieve zero accident and drastic reduction of safety violations.

**Keywords:** Training, Employees, Managing, Workplace, Accident, Oil, Gas, Industry.

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## INTRODUCTION

Training is a fundamental aspect of every production and service delivery system in every organization especially in high-risk Oil and Gas industry. It is an indispensable means of sharing information from a skilled and experienced authority to person believed to be less knowledgeable in content, skills and desired behavior. Activities within the industry are generally of high risk and hazardous because of the terrain and complex nature of high-tech equipment involved. These activities are seismic, drilling, construction, production, refining and transportation among others; couple with the volatile nature of hydrocarbon itself makes this working environment more hazardous. The combination of these makes accident occurrence within the oil and gas realistic and poses a challenge to workers in the sector. The probability and consequences of occurrence of certain top-events (accidents) are high in the industry especially when preventive and escalation controls are weak. Accident is among major threats to the survival and prosperity of Oil and Gas business and has led to occupational illness, injuries, death and assets worth billions lost as a result of operations. The consequences of accidents are unconceivable, and no responsible business organization will treat measures to prevent accidents with levity.

RPS Energy (2010) and Chand (2015) highlights some occurrences of accidents leading to loss of lives in the oil and gas sector from 1984 to 2009, the include; : Bhopal, Methyl Isocyanate gas leak - Union Carbide plant in 1984 with 4000 deaths; Bombay High, ship collision with platform and riser fire in 2005 with 22 deaths; Chongqing, sour gas blowout where 243 people died in 2003, Skikda, explosion on LNG plant resulting to 27 deaths in 2004;Nigeria, pipeline explosion where 100 people died in 2009.

Training is a key aspect of administrative control that has been adopted to create awareness, and also to develop and improve the competency of workers. Accident prevention training in Oil industry is indispensable due to risks and hazards that readily threaten the huge investment. Training provides participants with appropriate knowledge, skills and behavior required to perform certain job at workplace. Training for accident prevention encompasses all the knowledge, skills and behavior required by workers to understand what causes accidents and how to control them. Specifically, it focuses on informing and educating workers on hazards and effects management process (HEMP) at workplace. Workplace accident prevention training is legally and contractually obligatory, and in most cases an integral aspect of general business management process of organization. Accident prevention training is key component of a Health and Safety program which also is an integral component of a Safety Management System. Every training program design follows established standards and principles in line with setting and peculiar needs of the environment.

In addition, workplace accident prevention training interventions in the Oil and Gas Industry are not just carried out for the sake of fulfilling religious or administrative righteousness but fundamentally to comply with regulations, industry requirements and company policy objectives with the aim of equipping trainees with relevant in-need competencies required for effective performance of workplace tasks without harm to people, assets and environment. Additionally, such training intervention is a must-do in order to reasonably guarantee the safety of all resources in the overall interest of all industry stakeholders. On-site accident prevention trainings are carried out essentially to equip workers with relevant competencies to manage workplace hazards in order to achieve the goal of no harm to people, asset and environment. It is

also to comply with industry and regulatory requirements. The ultimate beneficiaries are the people who are protected and the business organization that make more profit due to no incident.

The Oil and Gas industry is highly regulated due to its nature and characteristics which involves mining onshore and offshore. Virtually all the phases of the industry involve huge capital and operational expenses due to the type of facility, equipment and skilled-manpower required to carry out the activities. The activities are high-risk and hazardous with very high chances of accident occurrence and unimaginable consequences. Worst cases have resulted to loss of lives, facility, equipment, severe environmental damages, litigations and even business closure. It is against this background that the provision of training to workers on how to manage workplace hazards becomes an indispensable management strategy to remain in business.

Training is an integral aspect of entire production and service delivery system in every organization especially in high-risk Oil and Gas industry. It is an essential means of communicating information from more knowledgeable authority to person believed to be less knowledgeable in content, skills and desired behavior. The terrain, complex nature of activities and high-technology equipment used in the industry posed significant challenge to the safety of people, the assets and operational environment. These activities are seismic, drilling, construction, production, refining and transportation among others. To this end, this research aim to evaluate the role of workplace accident training within the oil and gas sector, using Kirkpatrick-Philips 5 levels indicators.

### **Aim and Objectives**

The aim of the study is to evaluate the role of training employees in managing workplace accident in the oil and gas industry in Rivers State Nigeria., using Kirkpatrick-Philips 5 levels indicators. The specific objectives of this study are to:

- Evaluate the extent to which new competencies acquired in the training is transferred to workplace; and
- Investigate the outcome of the accident prevention training in terms of completing work without any incident.

### **Research Questions**

- To what extent do participants apply the new competencies acquired during the training in managing workplace hazards in order to prevent accidents?
- To what extent has the accident prevention training contributed to the achievement of accident- free operations?

### **Hypotheses**

- There is no significant difference in participants' ability to apply new competencies gained during the accident prevention training in managing workplace hazards to prevent accidents across the different sectional leadership
- There is no significant difference in the extent to which the accident prevention training has contributed in the achievement of accident free operations across three management sub-sections.

## METHODOLOGY

The research was carried out using a descriptive research design. Workers randomly selected from three (3) Engineering, Procurement and Construction (EPC) companies who had undergone various accident prevention training in integrated Oil and Gas projects at remote locations for a client under a single management portfolio participated in the study. They include managers, frontline supervisors and active workforce also described as indirect skilled, direct skilled and unskilled workers. The sample of the study is a total of 155 workers, which forms 32% of the population available at time of administration of instruments which contributed to the overall man-hours within the projects umbrella. Research design was descriptive and purposive sampling technique was adopted. A modified 4-point rating scale questionnaire tagged Evaluation of Application of New Competencies Questionnaire (EANCQ) and Assessment of Training Results Questionnaire (ATRQ) was administered and retrieved from a total of 155 workers (132 for EANCQ and 23 for ATRQ) across the three identifiable work groups for the purpose of evaluating transfer of learning into real workplace and outcome of accident prevention training which they had undergone at workplace. Evaluation of Application of New Competencies Questionnaire (EANCQ) measured level of learning transfer in terms of strongly agreed (SD) Agreed (A) Disagreed (D) and strongly disagreed (SD). While, Assessment of Training Results Questionnaire (ATRQ) measured outcome of the training in terms of strongly agreed (SD) Agreed (A) Disagreed (D) and strongly disagreed (SD). The instruments were subjected to face and content validity by expert in measurement and evaluation, safety training facilitators and industry professionals. Evaluation of Application of New Competencies Questionnaire (EANCQ) subscale had a Cronbach alpha coefficient of 0.83 while Assessment of Training Results Questionnaire (ATRQ) subscale had a Cronbach alpha coefficient of 0.78. the research questions were analyzed using the mean and standard deviation while the hypotheses were tested using One Way Anova statistics

## RESULTS

**Research Question 1:** To what extent do participants apply the new competencies acquired during training in managing workplace hazards in order to prevent accidents?

Table 1: Mean and standard deviation analysis showing extent the participants apply new competencies gained during accident prevention training in managing workplace hazards to prevent accidents in the different leadership sections

Sectional leadership	Construction supervisors (n = 29)		Operation supervisors (n = 35)		Support supervisors (n = 68)		General (n = 132)		Remark
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Transfer of Learning	27.13	2.54	27.02	2.87	27.48	2.97	27.28	2.84	High

$p > 16.00$

Results in Table 1 reveals that participants' ability to apply the new competencies gained during the training in managing workplace hazards to prevent accidents after training in the different supervisory skill pools (Construction Supervisors, Operation Supervisors and Support Supervisors) differs slightly to an extent as seen from their differing mean scores with a general

mean score of 27.28 and standard deviation of 2.84. This indicates that participants were able to apply new competencies gained during the on-site accident prevention training in managing workplace hazards to prevent accidents to a large extent. This is hinged on the premises that the criterion mean point of 16.00 and above indicates a high extent of application of new competencies gained during the accident training.

**Research Question 2:** To what extent has the accident prevention training contributed to the achievement of accident-free operations?

Table 2: Mean and standard deviation analysis showing extent to which accident prevention training has contributed to the achievement of accident-free operations across the different management sub-sections

Management Sub-sections	Construction (n = 10)		Operation (n = 8)		Support (n = 5)		General (n = 23)		Remark
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Results	31.60	4.30	31.50	3.55	27.60	1.82	30.70	3.87	High

$p > 18.00$

Table 2 Shows that the accident prevention training has contributed in the achievement of accident-free operation to differing extent as assessed by three different management sub-sections of Operations, Support and Construction as seen from their differing mean scores with a general mean score of 30.70 and standard deviation of 3.87. This indicates that the accident prevention training has contributed in the achievement of accident-free operations to a large extent. This is hinged on the premises that the criterion mean point of 18.00 and above indicates a high extent of contribution in the achievement of accident-free operations via the accident prevention training.

**Hypothesis 1:** There is no significant difference in participants' ability to apply new competencies acquired during the accident prevention training in managing workplace hazards to prevent accidents across the different sectional leadership (construction supervisors, operation supervisors and support supervisors)

Table 3: One way ANOVA showing no significant difference in participants' ability to apply new competencies acquired during the accident prevention training in managing workplace hazards to prevent accidents across the different sectional leadership (construction supervisors, operation supervisors and support supervisors)

LAPTQO2	Sum of squares	Df	Mean square	F	Sig
Between Groups	5.65	2	2.82	.346	.708
Within Groups	1055.40	129	8.18		
Total	1061.06	131			

Table 3 shows that the computed  $F(2, 129) = .346$ , i.e.  $p .708 > .05$  is not statistically significant. Therefore, the null hypothesis that states "there is no significant difference in participants' ability to apply new competencies gained during the training in managing workplace hazards to prevent accidents after training across the different skill pools (Construction Supervisors, Operation

Supervisors and Support Supervisors)” is accepted and the alternate rejected.

**Hypothesis 2:** There is no significant difference in the extent to which the accident prevention training has contributed in the achievement of accident free operations across three management sub-sections (operations, support, and construction).

Table 4: One way ANOVA showing no significant difference in the extent to which the accident prevention training has contributed to the achievement of accident free operations across the three management sub-sections (operations, support, construction)

ATRQ	Sum of squares	df	Mean square	F	Sig
Between Groups	61.27	2	30.64	.229	.127
Within Groups	267.60	20	13.38		
Total	328.87	22			

Table 4 shows that the computed  $F(2, 20) = 2.290$ , i.e.  $p > .05$  is not statistically significant. Therefore, the null hypothesis that there is no significant difference in the extent to which the accident prevention training has contributed in the achievement of accident-free operations across the different management sub-divisions of Operations, Support and Construction is accepted and the alternate rejected

## SUMMARY OF FINDINGS

Table 1 reveals that participant’s ability to apply the new competencies gained during the training in managing workplace hazards to prevent accidents after training in the different skill pools: Lead Construction Supervisors (LCS) Lead Operation Supervisors (LOS) and Lead Support Supervisors (LSS) differs slightly to an extent as seen from their differing mean scores. The table shows that participants from LSS skill pool that is, ( $\bar{x} = 27.48$ ,  $SD = 2.97$ ) has the highest level of application of the new competencies gained during the training in managing workplace hazards to prevent accidents after training which differs from the others to an extent and is followed by participants from the LCS skill pool ( $\bar{x} = 27.13$ ,  $SD = 2.54$ ) which differs from the others to an extent and is followed by participants from the LOS skill pool ( $\bar{x} = 27.02$ ,  $SD = 2.87$ ) which differs from the others to an extent. These varying mean scores indicate that participants applied the new competencies gained during the training in managing workplace hazards to prevent accidents after training in the different skill pools differs to an extent with a general mean score of 27.28 and standard deviation of 2.84. This indicates that participants were able to apply new competencies gained during the accident training program in managing workplace hazards to prevent accidents to a large extent. This is hinged on the premises that the criterion mean point of 16.00 and above indicates a high extent of application of new competencies gained during the accident training program in managing workplace hazards to prevent accidents after training and below a low extent of application of new competencies gained during the accident training program in managing workplace hazards to prevent accidents after training and as seen from the table above the mean of 27.29 is far higher than the criterion means of 16.00 thus showing that participants applied new competencies gained during the accident training program in managing workplace hazards to prevent accidents after training to a large extent. This clearly shows that there is transfer of learning.

The table 2 shows that the accident prevention training has contributed in the

achievement of accident-free operation to differing extent as assessed by three different management sub-sections of Operations, Support and Construction as seen from their differing mean scores. The table shows that the accident prevention training has contributed in the achievement of accident-free operation most in the construction management sub-division, that is, ( $\bar{x} = 31,60$  SD =4.30) which is followed by the Operations sub-management division ( $\bar{x} = 31.50$ , SD =3.55) which differs from the others to an extent and is followed by Support management sub-division ( $\bar{x} = 27.600$  SD 1.) which differs from the others to an extent. These varying mean scores indicate the accident prevention training has contributed in the achievement of accident free operation to differing extent across the three management sub-divisions. And a general mean score of 30.70 and standard deviation of 3.87. This indicates that the accident prevention training has contributed in the achievement of accident-free operations to a large extent. This is hinged on the premises that the criterion mean point of 18.00 and above indicates a high extent of contribution in the achievement of accident-free operations via the accident prevention training and below a low extent of contribution in the achievement of accident-free operations via the accident prevention training, and as seen from the table above the mean of 30.70 is far higher than the criterion means of 18.00 thus showing that the accident prevention training has contributed in the achievement of accident-free operations to a large extent. This shows positive result/ outcome of the on-site accident prevention training.

## **DISCUSSION**

The table 1 shows the mean score of 27.28 and standard deviation of 2.84, which indicates that participants were able to apply new competences acquired during the accident training program in managing workplace hazards to prevent accidents to a large extent. This is hinged on the premises that the criterion mean point of 16.00 and above indicates a high extent of application of new competencies gained during the accident training program in managing workplace hazards to prevent accidents after training and below a low extent of application of new competencies gained during the accident training program in managing workplace hazards to prevent accidents after training. And as seen from the table above the mean of 27.29 is far higher than the criterion means of 16.00 thus showing that participants applied new competencies gained during the accident training program in managing workplace hazards to prevent accidents after training to a large extent. This clearly shows that there was transfer of learning. Finding supports outcome of Vignoli, Punnett and Depolo (2014) investigation which affirmed that most people that received safety training averred that what they learned from such training were useful during task execution in workplace. This finding also agrees with Borate, Gopalkrishna and Borate (2014), Ruttenberg (2013) and Dhliwayo and Nyanumba (2014), among others studies which confirmed transferred learning as trainee indicated capability to use acquired competencies to solve practical problems at workplace. Researcher's interaction and observation were very much convincing that there was actually learning transfer. However, the percentage of what was really transferred out of quantity acquired was not established. It is believed that substantial quantity of what was acquired in the training was actually transferred because 90% of the total package was knowledge and how to work without being hurt or killed. Transfer of learning was also reinforced by workers consciousness not to get hurt, close supervision, strict compliance to safe work procedures, coaching, daily tool box meetings and job hazards analysis. One key finding during interaction was the worrisome barrier to transfer of learning resulting from work pressure to meet delivery targets. More than 50% of those interviewed confided in the

researcher that most times they face dilemma of willful violation against compliance with safe work practices in order to complete assigned tasks to meet up schedule because of sack threat if they fail to complete task as request by the boss. And, in most cases they were compelled not to apply strictly known safe work practices in order to complete work within specified timeframe, and therefore created room for normalization of non-compliance as right things were usually jettisoned in such cases.

Participants' ability to apply the new competencies gained during the training in managing workplace hazards to prevent accidents after training in the different skill pools (LCS, LOS and LSS) differs slightly to an extent as seen from their differing mean scores. The table shows that participants from LSS skill pool that is, ( $\bar{x} = 27.48$ ,  $SD = 2.97$ ) has the highest level of application of the new competencies gained during the training in managing workplace hazards to prevent accidents after training which differs from the others to an extent and is followed by participants from the LCS skill pool ( $\bar{x} = 27.13$ ,  $SD = 2.54$ ) which differs from the others to an extent and is followed by participants from the LOS skill pool ( $\bar{x} = 27.02$   $SD = 2.87$ ) which differs from the others to an extent. These varying mean scores indicate that participants applied the new competencies gained during the training in managing workplace hazards to prevent accidents after training in the different skill pools differs to an extent. Finding collaborated researcher's interaction and observation as the frontline supervisors and workers (LSS) rendering support services readily complied with safe work practices and procedures learned during training than the construction and operation spread probably because they exert less bodily stress.

One of the Logistic officers interviewed revealed that upfront planning was major key to translating learning from various accident prevention training to daily work execution as it has helped in preventing or reducing 'fire service 'response that would usually inhibit doing what is right. The construction spread (LCS) also demonstrated good use of what they learned from the three training packages evaluated despite the fact that they ranked next to the support spread. However, they faced multiple challenges because they are the key people actually doing the main work and also due to other factors, which include: nature of work environment, type and integrity of equipment used, worksite restrictions and interface issues, multiple and divergent instructions, attitude of supervisors and colleagues as well as other intervening challenges from clients and worksite dynamics. Two of those interviewed confided in the researcher that, at times, multiple and divergent instructions are issued on how best to execute one task against known procedure and that have led to not really implementing task in accordance with knowledge gained from training.

Finally, the operation spread seemed to view daily tasks more as routine activity and demonstrated more lackadaisical behavior to doing the right thing based on learning from accident prevention training. One of those interviewed informed the researcher that his manager will only get worried if the system is down or there is fire outbreak, and that transfer of technical knowledge learned is of greater value to him than learning from accident prevention training. Tested hypothesis did not support this finding wholly as it indicated that ability to apply new competencies gained during the training in managing workplace hazards to prevent accidents after training across the different skill pool of Lead Construction Supervisors (LCS) Lead Operation Supervisors (LOS) and Lead Support Supervisors (LSS) did not differ significantly.

The table 2 shows the mean score of 30.70 and standard deviation of 3.87. This indicates that the accident prevention training has contributed in the achievement of accident-free operations to a large extent. This is hinged on the premises that the criterion mean point of 18.00

and above indicates a high extent of contribution in the achievement of accident-free operations via the accident prevention training and below a low extent of contribution in the achievement of accident-free operations via the accident prevention training. And as seen from the table above the mean of 30.70 is far higher than the criterion means of 18.00 thus showing that the accident prevention training has contributed in the achievement of accident-free operations to a large extent. This shows positive result/ outcome of the on-site accident prevention training. Finding supports outcome of works of Ruttenberg (2013), Borate et al. (2014), The South Australian Freight Council (2015), Bianchini, Pellegrini, Peta and Saccani (2014), and Dhliwayo and Nyanumba (2014) that variously unveiled that safety training created positive impact in terms of accident prevention/ reduction, improved quality and even boosting production. The main objective of accident prevention training is to ensure the achievement of ZERO ACCIDENT, meaning no incident. Workers from the three companies contributed significantly to the achievement of over 20 million LTI-free man-hours within the last 5 years (2013-2018) on current projects for the same client. Monthly, Annual and Project-to-date reports sighted from secondary data sources (HSE Statistics records) confirms very impressive HSE performance attributable largely to increased on-site HSE awareness resulting from planned accident prevention training. 18 of the managers interviewed believed that on-site accident prevention training contributed largely to achievement of goal zero at locations. While, only 5 believed that on-site accident prevention training did not make greater contribution to the achievement of goal zero at location more than workers' motivation and care for people program established from the inception of projects. Respondents in the latter category believed that success was interdependent on both training and other intangible management encouragement.

It also revealed that accident prevention training has contributed in the achievement of accident-free operation to differing extent as assessed by three different management sub-sections of Operations, Support and Construction as seen from their differing mean scores. The table shows that the accident prevention training has contributed in the achievement of accident-free operation most in the construction management sub-division, that is, ( $\bar{x} = 31.60$  SD =4.30) which is followed by the Operations sub-management division ( $\bar{x} = 31.50$ , SD =3.55) which differs from the others to an extent and is followed by Support management sub-division ( $\bar{x} = 27.60$  SD 1.) which differs from the others to an extent. These varying mean scores indicate the accident prevention training has contributed in the achievement of accident free operation to differing extent across the three management sub-divisions. Finding is in line with nature and sphere of tasks executed by the three categories of work group. Construction activities are high risk with great potential to cause harm, such as: mechanical and manual lifting, excavation, welding, coating, and electrical and instrument installation, radiography, pressure testing and all manners of activities carried out underground, surface, confined space and even at height, both in brown and green fields. It is therefore not surprising to note that construction workers mainly at the cool face of activities are required to undergo series of technical and safety competency training prior to engagement, and sustained refresher sessions throughout the duration of work.

All the participants interviewed believed very strongly that they cannot engage anyone to do work when such person has not undergone the mandatory or recommended accident prevention training. For instance, it is mandatory for everyone entering workplace to undergo site safety orientation program. Secondly; no worker touches an object if you have not undergone basic HSE levels 1-3 training. It is on this premise that those interviewed believed that on-site accident prevention training contributed significantly to the achievement of goal zero, nay drastic reduction of workplace incidents. The operation team interviewed also believed in the

potency of accident prevention training in the achievement of goal zero or drastic reduction of workplace accidents but argued that facility integrity and health are also key contributors to achievement of accident free operations.

One of the team leaders interviewed averred that facility health and integrity is critical in this era where most facilities are designed to run virtually unmanned and to burn down, and wonder the critical role accident prevention training plays in achievement of goal zero. For him, health awareness training is priority for people in control rooms, security and catering personnel. While, the support category also believed in the contribution of on-site accident prevention training to the achievement of goal zero but reasonably differed from both construction and support team as some of those interviewed stressed that it was a combination of training and luck. A section of those interviewed told the researcher it is God not any kind of training. Again, this accounts for the third place roll of the support team. Tested hypothesis did not support finding as it indicated that the contribution of accident prevention training in the achievement of accident-free operations across the different management sub-divisions of Operations, Support and Construction did not differed significantly.

## CONCLUSION

Following investigations and findings it is evident that implementation of on-site accident prevention training interventions in oil and gas industry is in compliance with regulatory and industry requirements. Aside these, the intervention are seen essentially as integral part of entire production and service delivery process which enhanced cost saving, higher profit and overall well-being of organizations. Three major conclusions were drawn from each of the indicators measured, as follows:

- **Participants Level of Learning Achievements in the three On-site Accident prevention training programs.**

The results of the studies showed that mean scores are far higher than criterion mean points in the three different on-site accident prevention training evaluated, indicating high level of understanding. This clearly shows that virtually all the participants acquired new knowledge, skills and behavior from the training, which means that learning, took place. It was clear from observation and engagement that workers demonstrated that they acquired novel competencies which they never had prior to the trainings.

- **Extent Trainees across the Skill Pools Apply the New Competencies gained during the Training in Managing Workplace Hazards to Prevent Accidents**

The study showed mean score far higher than the criterion mean indicating that participants applied new competencies they acquired from the accident prevention training in managing hazards at workplace to prevent accidents after the training. This clearly shows that there was transfer of learning. Although the quantity (percentage) of what was transferred from new acquisitions were not measured but it was clear from observations and feedback from line supervisors that large chunk of new competencies were used at workplace

- **The Extent On-site Accident prevention training has Contributed in the Achievement of Accident-free Operation**

The result of the study showed mean score far higher than the criterion mean indicating that the on-site accident prevention training contributed immensely to the achievement of accident-free operations to a large extent. This shows positive result/ outcome of the on-site accident prevention training. Evidence include; increased number of unsafe acts and conditions reported daily by participants, reduction in the number of violations, reduction in the number of workplace incidence, reduction in the number of reworking cases and ‘stop work’ for safety intervention, man-hours and other resources that would have been deployed to investigate accidents and the consequential costs were saved, improved site housekeeping, increased HSE compliance level and higher morale among workers, etc.

### **Recommendations**

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

- Company’s management should continue to support every effort towards continuous improvement of on-site accident prevention training programs in order to sustain workers interest since the interventions meets their expectations and helps in boosting their morale and production. Planning and implementation should be workers-centered but without undue interference with production and service delivery.
- All stakeholders to sustain the implementation of on-site accident prevention training since it have become evident that workers truly acquire novel and functional competencies in the training. There should be regular review of accident prevention training to bridge gaps that may be created due to incursion of new technologies, regulations, standards, procedures and site environmental challenges in order to sustain learning.
- Company management should embark on periodic evaluation of on-site accident prevention training events in order to determine its effectiveness or otherwise. Outcome of this evaluation demonstrated that ongoing on-site accident prevention training program have contributed reasonably to zero accident and drastic reduction of safety violations.

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