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PERCEIVED EFFECTIVENESS OF SAFETY INCENTIVE PROGRAMME AMONG OIL AND GAS TECHNICIANS WITHIN THE NIGER DELTA REGION OF NIGERIA

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ABSTRACT

This study was conducted to find the perceived effectiveness of safety incentive programme among oil and gas technicians within the Niger Delta region of Nigeria. This became necessary due to the nature of their work, especially being exposed to unsafe working conditions. A survey research design was used in the study with a sample size of 50 technicians drawn from onshore and offshore platforms, regular and contract staff covering both maintenance and operations departments. Findings from the study shows that tangible and intangible rewards are the most commonly used incentives in the oil and gas industry. Financial rewards and promotion at work are the least used incentives in the industry with more focus on team reward/recognition than individual reward/recognition. Proactive reporting was not impacted by implementation of safety incentive programmes though generally effective in improving health and safety management within the industry. The study recommends that organisation using safety incentives should promote a holistic approach to safety as a culture of safety is required for optimum performance.

KEYWORDS

Safety, Incentives, Accident, Reporting, Oil and Gas Company.

Introduction

Safety cultures, principles and consciousness are generally incorporated into a company's culture right from inception through embraced principles, managerial support, safety training, safety programs, rules, processes, and procedures. Unsafe actions and behaviors at workplace have been identified as one of the primary variable that contribute to work-related accidents and injuries (Hinze, 2012). Inadequate safety procedures led to the 1986 Chernobyl nuclear tragedy in Pripyat, Ukraine, which is when safety consciousness started to emerge (Pidgeon, 1999; Tuyl, 2016). The catastrophe brought about a global awareness of the need to enhance safety protocols across industries. The establishment of safety culturesand behaviors have been proposed by a number of scholars as a potential method for enhancing the quality of the work environment by empowering management to create risk-free working conditions (Khan *et al*., 2014).To enhance a safer work environment, companies develop, fosters, manages, and rewards/punish workers' safety consciousness using incentives/disincentives which is an aspect of behavior-based safety management (BBSM) system. The public's understanding of incentive/disincentive programmes, has increased over the past few years as more safety conscious companies begin to embrace it.

The use of safety incentives/disincentives is based on the theory of motivation that positive reinforcement as a consequence of certain behavior increases the chances that they will happen again (Freeman 1997; Ferrante 2011). Thus proponents of incentive programmes claim that the programme builds and maintains employee interest in working safely and acts as a motivator for employees to work more safely (Prichard 2001; Potter and Potter 2007; Nelson 2012).The effect of rewards on motivation and performance has been studied in both management and safety literature (Prichard 2001). People like to be appreciated and to feel significant, thus employee recognition and involvement is the key to boost staff morale and engagement towards safety practices. The challenge, however, is that motivation for work involves a complex interaction process.Though safety incentive programme is implemented to portray an organisational culture that encourages safety and health, it is intended to improve individual's motivation for safety and health (Goodrum and Gangwar 2004). This therefore raises the question of how an externally applied incentive can result in motivation since motivation is mostly intrinsic.

Research on high reliability organizations (HROs), such as offshore petroleum platforms, has led to increased emphasis on behavioral and mindful safety procedures (Dahl and Kongsvik, 2018) to forestall any occurrence of accident because this could be very disastrous to the company, workers and the ecosystem. Apart from the workers being safety conscious, timely report of a potential risk is very important especially for the technicians who are most times the ones exposed to the most risky situations. Oil and gas technicians engage in activities that may expose them to serious hazards such as falling from towers, unguarded machineries, being stuck by heavy equipment, electrocutions, silica dust etc.Studies in the literature demonstrate that technical safety management calls for the engagement of both the organization and the workforce (Neal, *et al*., 2000; Siu *et al*., 2004; Singer *et al*., 2009; Clarke, 2010; Zang*et al.,* 2016). Safety cases become more complicated when dealing with technical workers whose work are quite variable with a high probability of accident/injury. This study therefore seek to find the perceived effectiveness of safety incentive programmes among oil and gas technicians in the Nigerian Niger Delta region.

Research Method

A survey research design was used in the study. Correlational research strategy was adopted with an attempt made to demonstrate that a relationship exist between the variables. A multi-stage application

of probability-based sampling method was used to select the samples. First, a clustered sampling method was used to select the organisations to be sampled. Secondly, within each cluster, a simple random sampling method was applied to select the study samples in a totally random fashion without replacement. This process was considered as a fair and unbiased process, giving equal chances of selecting the study participants. A questionnaire designed to obtain a fair representation of the perception of all categories of workers using a five-point Likert-type scale (Strongly disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5) was used for the data collection process. The questions were phrased such that "Strongly disagree" indicated negative relationship between applicable variable whereas "Strongly agree" indicated a positive relationship. The „Neutral" option was given for those without sufficient information to justify an opinion; were indifferent to the subject; or thought the good and bad points were about equal.

A sample size of 50 was used for the study. Descriptive statistics and correlation were used to analyse the obtained data. Chi-square test of independence was adopted to assess the probability of association between the variables.

Results and Discussion of Findings

Table 1 shows the summary of response to the different questions based on work level, work type and work group. This helps to check whether work level, work type and work group have any impact on effectiveness of safety incentive or disincentive programme. As can be seen from the table, about 70% and above respondents generally agreed that tangible (78%) and intangible (74%) rewards are the most prevalent in the industry. On application of incentives programmes, the most prevalent (94%) is on reporting of unsafe acts and conditions, while the most prevalent disincentive programme is punishing people who violate safety rules (84%). While 84% of respondents agreed that safety incentives impacts on safety and health improvement, only 20% agreed that it impacted on proactive reporting, while only 12% perceived impact on injury reporting.

Table 1: Summation of Percentages of Respondents by Categories that Agreed and Strongly Agreed

Questions		All	Technical	Supervisor	Regular	Contract	Operations	Maintenance
	Types of safety incentives							
1	My organisation gives financial rewards	39	39	40	40	36	56	30
2	My organisation gives intangible awards (e.g. certificates of recognition, dinner or cocktail)	74	72	75	86	43	68	81
3	My organisation gives tangible gift items	78	74	87	81	69	84	74
4	My organisation rewards people with promotion for outstanding safety performance	42	46	33	37	54	53	36
	Application of Safety Incentives:							
5	My organisation rewards or recognizes people for reporting unsafe acts or conditions	94	94	94	97	86	100	89
6	My organisation rewards/ recognizes people for involvement in safety activities (e.g. meetings, inspections)	72	69	81	67	86	58	78
7	My organisation punishes people who violate safety rules	82	81	87	86	71	78	85
8	My organisation rewards individuals for reporting injuries sustained at the workplace	16	19	13	8	36	16	15
9	My organisation rewards department or teams for low accident rates	58	58	56	58	57	74	48
10	My organisation does not punish individuals who are injured or involved in accidents	40	36	50	39	43	47	33
11	My organisation does not punish departments or teams is a team member is injured at the workplace	47	42	60	44	54	53	42
	Effectiveness of Safety Incentives							
12	I report unsafe acts and conditions because of safety incentives	20	25	6	19	21	16	22

13	I am committed to working safely so that my team or department can be rewarded	26	31	13	22	36	16	30
14	If I am injured or involved in accident, I will not report it for fear of being punished	12	11	13	11	14	11	15
15	Safety incentives is effective in improving safety and health at my work place	84	83	81	86	79	84	81

Table 2 shows the test of independence for the responses on how safety incentives contribute to proactive reporting (reporting of unsafe acts and conditions). This is to enable determination of the probability that the difference is NOT due to chance.

Table 2: Test of Independence of Responses on Impact on Proactive Reporting

Impact on Proactive Reporting - Actual Perception			
Score	Supervisor	Technical	Total
Score = 5	0	3	3
Score = 4	1	6	7
Score = 3	0	1	1
Score = 2	8	14	22
Score = 1	5	10	15
Total	14	34	48

Impact on Proactive Reporting - Expected Perception			
Score	Supervisor	Technical	Total
Score = 5	0.875	2.125	3
Score = 4	2.042	4.958	7
Score = 3	0.292	0.708	1
Score = 2	6.417	15.583	22
Score = 1	4.375	10.625	15
Total	14	34	48
P	=	0.55	

Table 3 shows the test of independence of the supervisors and technical workers responses on impact of safety incentives on reactive (injury) reporting.

Table 3: Test of Independence of Responses on Impact on Injury Reporting

Impact on Injury Reporting - Actual Perception			
Score	Supervisor	Technical	Total

Score = 5	1	1	2
Score = 4	1	3	4
Score = 3	0	6	6
Score = 2	7	18	25
Score = 1	5	6	11
Total	14	34	48

Impact on Reporting Injuries - Expected Perception			
Score	Supervisor	Technical	Total
Score = 5	0.58	1.42	2
Score = 4	1.17	2.83	4
Score = 3	1.75	4.25	6
Score = 2	7.29	17.71	25
Score = 1	3.21	7.79	11
Total	14	34	48
P	=	0.36	

Table 4 shows the computation of Chi-square critical value using the data in table 4.4, where: This is to enable test of the null hypothesis that implementation of safety incentive programme does not result in increase in proactive reporting.

F_o – Observed frequency, F_e – Expected frequency, df - Degree of freedom, r - The number of levels of the first independent variables, c - The number of levels of the second independent variables, $\alpha = 0.05$, χ_o^2 – Calculated chi- square value, χ_t^2 - Critical value (from Chi-square statistical table).

Table 4 Computation of Chi-square Critical Computed Value (X^2_c)

Improvement in Proactive Reporting				
F_o	F_e	F_o-F_e	$(F_o-F_e)/F_e$	$(F_o-F_e)^2/F_e$
0	0.88	-0.88	-1.00	0.88
1	2.04	-1.04	-0.51	0.53
0	0.29	-0.29	-1.00	0.29
8	6.42	1.58	0.25	0.39
5	4.38	0.63	0.14	0.09
3	2.13	0.88	0.41	0.36
6	4.96	1.04	0.21	0.22
1	0.71	0.29	0.41	0.12
14	15.58	-1.58	-0.10	0.16
10	10.63	-0.63	-0.06	0.04
X^2_o				3.07

Using the data in table 4.6,

Degree of freedom, df = (r – 1)(c-1), where r =2 and c =5

df = (2-1)(5-1)=4. $\chi_t^2 = X^2_{0.05} = 9.49$

Table 5 shows the computation of Chi-square critical value using the data in table 4.5. This is to enable test of the null hypothesis that implementation of safety incentives does not result in reduction in injury reports.

Table 5 Computation of Chi-square Critical Computed value (X^2_c)

Impact on Injury Reporting				
F_o	F_e	F_o-F_e	$(F_o-F_e)/F_e$	$(F_o-F_e)^2/F_e$
1	0.58	0.42	0.71	0.30
1	1.17	-0.17	-0.14	0.02
0	1.75	-1.75	-1.00	1.75
7	7.29	-0.29	-0.04	0.01
5	3.21	1.79	0.56	1.00
1	1.42	-0.42	-0.29	0.12
3	2.83	0.17	0.06	0.01
6	4.25	1.75	0.41	0.72
18	17.71	0.29	0.02	0.00
6	7.79	-1.79	-0.23	0.41
X^2_o				4.35

df = (2-1)(5-1)=4.

$\chi_t^2 = X^2_{0.05} = 9.49$

In order to ensure that the data obtained were relevant to the industry, questions on the applicable safety incentives programmes were included in the questionnaire. From the results, over 70% of the respondents agreed at varying levels that tangible and intangible rewards are used. Most respondents did not agree that financial rewards or promotion are used as safety incentives in the industry. From this, it can be concluded that tangible rewards (such as gift items) and intangible rewards (such as certificates of recognition, dinner or cocktail) are the most prevalent in the industry. Except for contract workers, about 70% and above respondents in all the other categories agreed at varying degrees to the use of intangible awards as safety incentives. It was observed that the use of tangible gift items (about 78%) is the most prevalent form of safety incentives followed by use of intangible awards (about 74%). Monetary incentives is the least used in the industry (about 39%) while promotion (about 42%), though not prevalent, is used more than monetary rewards. This portrays that organisations in the industry tend to agree with proponents of use of nonmonetary incentives such as Gostick and Elton (2007), Nelson (2012), Wilson (1999), Prichard (2001), and Armstrong and Murlis (2005) that employees hunger for praise and recognition more than for money.

On application of incentives programmes, the most prevalent (94%) is on reporting of unsafe acts and conditions, while the most prevalent disincentive programme is punishing people who violate safety rules (84%). This shows the application of a combination of positive and negative incentive programmes.This therefore indicates that the different safety incentive approaches are applicable in the industry. The number of respondents that agreed to varying levels that their organisations punish individuals who are injured or involved in accidents, or teams if a team member is injured at the

workplace was above average. This portrays a trend towards use of negative incentive to encourage health and safety improvement.

The results also showed that implementation of safety incentive programme results in increase in proactive reporting of unsafe conditions since $X^2_o$is less than X_t^2 (that is, 3.07 < 9.49). This is in line with the findings of Prichard (2001), Potter and Potter (2007) and Hopkins (2002) who stated that safety incentives does not directly improve behaviour but at best only secure temporary compliance with directives, and only for as long as workers can see a direct connection between action and reward.

Also, results show that implementation of safety incentives results in reduction in injury reports since X^2_o was less than X^t_2 (4.35 < 9.49). This could be due to implementation of safety disincentive such as punishing workers who violate safety rules, one of which is, injury reporting. This creates a culture where violation of safety rules such as hiding of incidents or injuries is encouraged. Workers then tend to hide injuries and accidents for fear of being punished. In the offshore oil industry, the aim of accident analysis should be extended from focusing only on individuals at the 'sharp-end', to examining the role of organisations up to top-level management.

About 84% of respondents agreed at varying levels that implementation of safety incentives improves health and safety at the workplace. There was also consistency in response when respondents were analysedbased on work group, job level and work type. It was obvious that respondents generally accept that implementation of safety incentive programme contributes to improvement in health and safety in the oil and gas industry.

Conclusion

The study showed that both tangible and intangible rewards are the most commonly used incentives in the oil and gas industry. Positive incentives are used with intention of improving proactive monitoring while negative incentives (punishment) are used to discourage violation of safety rules. Financial rewards and promotion at work are found to be the least used incentives in the industry while focus is more on team reward and recognition than individual reward and recognition. Proactive reporting was found not to be impacted by implementation of safety incentive programmes. The implementation of safety incentives was found not to result in reduction in reactive (injury and accident) reporting in the industry Generally, it was found that safety incentive programmes is effective in improving health and safety management within the industry. The study recommends that organisation using safety incentives should promote a holistic approach to safety as a culture of safety is required for optimum performance.

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