

THE CORRELATION BETWEEN WORK AND PERFORMANCE OF MAINTENANCE PERSONNEL IN MAINTENANCE FUNCTION

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Abstract

The study examines how performance of maintenance staff in maintenance function is influenced by the nature of work involved in the establishment. It reveals that the coefficient of correlation between performance and work is $R = 52532$, indicative of a fairly good positive correlation. When the hypothesis of the study that performance of maintenance personnel is not dependent on the staff nature of work is tested at .05 level of confidence, it is observed that Signum $T = .0007$, which is lower than .05 level of confidence. As a result, the hypothesis is rejected, implying that maintenance personnel performance is dependent on the work assignment. It is recommended that this work is clearly defined, facilities for its execution provided, and the maintenance staff motivated.

Introduction

Work done in the manufacturing industries are many and varied. These have different influences on the workers, as reported by Turner and Lawrence (1965), Remie and Whitmore (1985), Roomsek (1989), Rose (1997) and Porter (1961). For maintenance function, as it affects maintenance personnel's, work in this area, has been very limited, despite the contributions of Krishmaiah (1995); Kodali and Chandra (2001), that considered Productive Maintenance with negligent treatment of the maintenance staff involved in the exercise. It is this type of apparent neglect of the maintenance personnel in the industries that makes these group of industrial workers to be "complainers". Management of manufacturing industries sees the maintenance personnel as a staff who only knows how to "dismantle" and "fix" components, whose work is not directly involved in manufacturing. It is this beclouded view that probably compelled most researchers in the manufacturing industries to concentrate their works on examining the activities of manufacturing workers (production staff), and ignoring the maintenance personnel. This research is tailored to determining how the nature of work performed in the industry do actually affect the performance of maintenance staff. It will further answer the question whether work can be used to predict the performance of a maintenance staff in the discharge of maintenance function.

Methodology

Selecting the Industries and Subjects for the Study

Twenty-five (25) manufacturing industries operating in Nigeria, with adequate maintenance facilities, were contacted for the study. This is done to determine the influence work has on the performance of the maintenance staff in the discharge of his employed function. Work in this study refers to maintenance personnel employed to perform compressor/pump/servicing, installing valves, and gages, attending to breakdowns etc. It does not involve any other assignments given to the maintenance staff occasionally in a place of work, such as being chairman or members of committees etc.

For the study, nineteen (19) manufacturing industries located in ten (10) states of Nigeria, which met the researchers conditions with respect to size, accessibility and logistics were selected. Since the maintenance staff in the nineteen (19) selected industries have staff of not more than ten (10), the decision was to randomly sample two (2) from each of these industries at random. This done, the number of subjects involved in the study was thirty-eight (38).

For the independent variable (Work), the subjects reaction to work in their places of employment, was obtained by administering questionnaires (Job Descriptive Index) developed at Cornell University. This Job Descriptive Index (JD1) is used to measure job satisfaction. The specimen of the questionnaire is shown in Appendix 1. The layout of the J.D.I questionnaire is designed so that a respondent checks under "Yes" if an item describes his job "No" if an item does not describe his job, "Do Not Know", if he cannot decide for the different responses, the scoring are as

follows: Yes to a positive item "3" .No to a negative item "3", DO NOT KNOW ("I"). Yes to a negative ("O") and No to a positive item ("O"). The scores are to be summed for each of the three dimensions.

The data obtained for responses on work is shown in table 1.

Determination of Maintenance Personnel Performance (Dependent Variable in Using Time Slotting Method)

Time slotting has successfully been used for function measurement in plant maintenance of industrial facilities, Wilkinson (1966), Marinello (1976), and Mann (1976). The same is adopted in this study to determine the performance of maintenance staff in the studied manufacturing industries. The development of a slotting scheme for this work is based on the historical information on the time by maintenance staff to close-work orders completed maintenance jobs, for a period of twelve months supplied by a Nigerian based manufacturing industries. The details of the close-work orders are omitted to shorten the report. Using this approach, the data for maintenance staff performance and the data from the questionnaires are shown in Table 1.

Table 1

S/NO	PERFORMANCE	WORK
1	73	46
2	75	45
3	80	50
4	83	48
5	81	45
6	70	36
7	65	38
8	80	45
9	84	46
10	68	45
11	70	37
12	74	44
13	65	34
14	78	39
15	64	40
16	65	42
17	68	34
18	70	33
19	79	50
20	65	38
21	74	35
22	68	48
23	82	50
24	79	45
25	74	45
26	65	36
27	63	42
28	63	50
29	72	40
30	68	36
31	73	42
32	72	34
33	76	45
34	80	46
35	75	50
36	72	46
37	76	45
38	80	48

Test Result

The data in table 1, is analyzed using the computer software statistical package for Social Sciences (SPSS). The computer print outs are omitted for brevity.

- From computer output, the coefficient of correlation is deduced as $R = .52532$, indicative of a positive correlation between work (X) and performance (Y).
- It is further, deduced that the coefficient of determination between work and performance is $R^2 = .27596$, which implies that work gives only 28% of the explanation of the dependent variable performance (Y) which further shows that other factors affecting performance do exist.
- Furthermore, from the same output data, it is deduced that the standard error existing in the study is 5.34098, is high, indicative of the variation around the multiple regression equation involving the two factors (work and performance).

- (d) It is also revealed that F. Ratio, Signif F and T = 0.117, T = 3.704 and Sig T = .007, useful for testing the hypothesis, if Sig. T is less than .05, level of confidence the hypothesis is rejected.
- (e) Some other data presented in the computer print outs are not analyzed in this work.

The Hypothesis of the Study

Hypothesis(HO1). There is no significant relationship between work and maintenance personnel's performance in maintenance function.

With reference to the data in computer output, testing the hypothesis, since Sig. T = .007 is less than .05, the level of confidence, the hypothesis is rejected which implies that work has a significant relationship with performance of maintenance staff in maintenance function so, can be considered as a predictor. The predictor equation is developed as shown below.

Based on the information provided , it is possible to carry out a Bivariate Analysis of dependent variable performance (Y) and the independent variable work (X), and deduce the regression equation as shown:-

The regression equation between work (X) and performance (Y) is represented analytically as:

$$Y = A + BX \dots\dots\dots (1)$$

Where Y = Dependent Variable, and X is the independent variable

From computer output Data for A and B are obtained as:

A = 46.985939 = Intercept.
 B = .607870 = Regression Coefficient, Substituting these data into Equation (1)
 Y = 46.985939 + .607870 X \dots\dots\dots (2)

This is represented graphically in Fig 1.

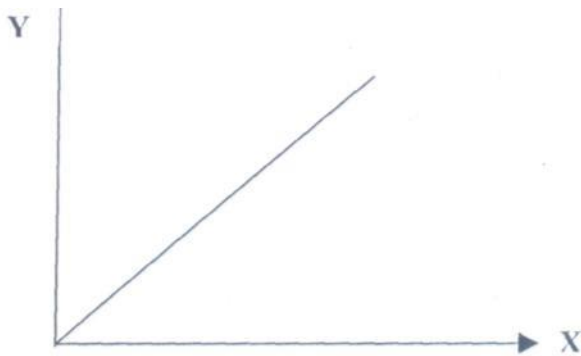


Fig 1 Performance Versus Work.

This represents a positive linear equation. It simply means that as the work increases that performance also increases. The implication of this is discussed in the next section of this paper.

Discussion

The information obtained considering work, the independent variable and performance, the dependent variable, supports the assumption that work, its nature and form, which are within the skills of the maintenance staff will increase performance. This work is the type that suits the worker, the one that motivates the worker to action as opined, Herzberg et al (1959). This gives rise to worker's high productivity. On the other hand, if the work is tedious, unhealthy unattractive and not motivating, as in the cases with some high risk jobs, which in more often with maintenance activities, there may be low productivity, if the necessary inducements such as supply of tools, equipment, infrastructures and healthy environment, are not provided. In this research, the study group, the maintenance personnel by their responses on their work involvements, showed that as far as they are concerned, there exists a positive relationship between work and performance. This work goes to improve the findings of Turner and Lawrence (1965), who disclosed that there is a significant positive interaction between job training and discretion amongst industrial workers. This work further discloses that work is a factor useful in predicting maintenance staff performance, as well as technical communication, Iwuoha (2001a), attitude, Iwuoha (2001b) and education, Iwuoha (2004).

Recommendations

In the light of the results obtained from the study, the recommendations made are these.

1. A maintenance staff should be assigned to the job he is trained to execute efficiently.
2. The situation where any staff in employment is made to execute any functions outside his specialty should be discouraged.
3. Since work, its nature, affects performance, the content of the work should be fulfilling, and work environment highly conducive.

Conclusion

It is essential to ensure that all factors that go to improve the productivity of the maintenance staff in the work places are adequately taken care of by the management. One such factor, the work, should be clearly defined, materials/equipment for its execution provided, and the maintenance personnel motivated morally and financially.

Appendix 1

The Specimen of Questionnaire on Work for Maintenance Staff

Work	Yes	No	Don't Know
Fascinating			
Routine			
Satisfying			
Boring			
Good			
Creative			
Respected			
Hot			
Pleasant			
Useful			
Tiresome			
Healthful			
Challenging			
On your feet			
Frustrating			
Simple			
Endless			
Gives sense of accomplishment			

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