ASSESSMENT OF THE MAINTENANCE OF EQUIPMENT FACILITIES IN TELEVISION TRANSMISSION STATION IN OYO TOWN OF OYO STATE

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Abstract

Maintenance is a highly skilled craft combining art and science. It requires technical knowledge as well as real understanding of engineering and critical performance of transmission equipment and machine for adequate performance of the required output. The population for the study was made of up of 52 engineering staff in the television transmission station, due to the small number all the engineering staff was adopted as the sample for the study. Questionnaire was used to elicit responses from the respondents, the arithmetic mean was used as a statistical tool to obtain the results. The findings showed that eleven out of thirty-five preventive maintenance activities was inadequate while twenty-one activities of corrective maintenance was found not suitable, while two out of managerial strategies was found to be disagreed on the maintenance of television transmission station in Oyo town. It was hereby recommended that installers and repairers of Nigerian Television Authority (NTA) should have good eyesight and colour perception to work with the intricate component used in television transmission station for effective performance.

Keywords: Assessment, Maintenance, Equipment Facility, Television, Transmission Station

Introduction

Maintenance of resources is crucial for preventing wastages and attaining maximum utilization through availability and longevity of the resources. According to Oedewald (2002), the aim of maintenance is to guarantee the safe, reliable and cost-effective production, which includes preventive maintenance, planned outages and repairs.

Maintenance in engineering is the function that should be carried out at scheduled time in order to keep the plant or engineering equipment in good operating condition. It is an important aspect of every establishment be it manufacturing or production industry. A breakdown is the result of inadequate maintenance of machine and equipment in all workplaces which will definitely lead to delay in the performance of the establishment or frustration in the production sector.

For any equipment, machine or appliance to function properly and to last long, it is important that one acquires reasonable knowledge of how it works and, most importantly follow the guidelines provided for its maintenance. The knowledge of the working mechanism of the equipment will give one a sense of appreciation of the importance of every item of maintenance so that one will know the actual time to carry out the maintenance exercise.

Transmission involves the radiation of waves into space from the point of generation and their reception at another point, this principle make use of communication or broadcasting in transmitting messages, speeches or music from one place to another by radio, or television. The radio wave must first be generated before they can be transmitted and received in radio and television set which may be located several kilometers away from the source of generation (Bamiro, Nurudeen & Akuru 2004).

For a transmission station to function at all. It will consist of these principal elements
(i)   A microphone which is used to control the radio waves in accordance with the information to be transmitted.
(ii)   A radio signal transmitter that will generate the radio frequency.
(iii)   A transmitting aerial to send out the waves into space.

An aerial must be fed with radio frequency (r.f) power to emit radio waves effectively (Duncan, 1985) but speech and music produce audio frequency (a.f) voltage and current. The transmission in broadcast television occurs when the video signal is transmitted by amplitude modulation of a carrier in the ultra high frequency u.h.f band.

Maintenance is an activity carried out for keeping equipment, appliances and other peripheral of the communication and transmission gadget in good working condition for present and future use. Alkinson (1990) defined maintenance as the process of sustaining construction and production elements in safe and usable condition. Also, FEC (2009) opined maintenance as the process of taking approved steps and precaution to care for a piece of equipment, facility, machinery and ensure that it attains its maximum functional self life.

Maintenance is the act of keeping assets in acceptable condition or at a prescribe level of performance (Rautheon 2003). Maintenance can be conceptualized as the process of restoring equipment, machine, electronic gadget and facilities in good working condition to ensure that it attains maximum functional self life. According to Elekwa; Bamiro; Olujide; Ladoye, Nurudeen Akuru & Olapade (2007) maintenance of any engineering equipment can be placed under three general headings predictive, preventive and corrective maintenance.

Predictive maintenance is the method of using modern devices to predict, or foresee an impending breakdown in a machine. By this prediction, an immediate intervention to arrest the situation should be adopted to prevent the breakdown of the machine, equipment and the facilities. While preventive maintenance is any activity carried out on any equipment or machinery even before the need arises. It forestalls the possibility of a major or total breakdown of the equipment or machinery, such activities involves checking equipment or machinery before time envisaged, servicing and overhaul of the equipment. Adequate lubrication, painting of buildings and cleaning of equipment before it is over due. The most important part about preventive maintenance is that it must be planned and be consistent. Corrective Maintenance is the repair work carried out when equipment has broken down. it is an activity designed to restore a machine, equipment or facility to its initial standard. It involves minor and major repairs necessary through troubleshooting and replacement of bad element or worn-out parts of the machine, equipment or facility (Bruce & Jenny 1998). The goals of reliability, condition base, predictive and preventive maintenance are all the same which is to keep assets working in optimal condition for the longest period of time at the lowest overall cost to an organisation

Assessment is the process of ascertaining the value of work of a performance of certain facility over a period of time (Ogunniyi 1999). Therefore to sustain the functionality of equipment, machine and other facilities in the television transmission station their operations and performance must be evaluated periodically. Federal Government of Nigeria has enjoyed a boost by the establishment of a number of television transmission station in towns and cities in the country across the state. To bring the activities of the federal government to the grassroots and to disseminate valuable information and quick-orientation of masses. Nigeria Television Authority (NTA) established a local television transmission station at Oyo town in Oyo State of Nigeria. It was located at Apitipiti Area in Oyo-East local government of Oyo State. It is transmitting at channel 37 with 593 MHZ. Frequency by virtue of its duty in disseminating information to the grass root. It is imperative to assess the maintenance of equipment, machine and other facilities in television transmitting station.

Statement of the Problem

The television transmission station is a rare communication facility, which almost disappoint the viewers and the subscribe that patronize the stations. So many educative, culture and religious programme scheduled for viewing get failed due to the poor maintenance of the television station, on so many occasions, the transmitting station do off on air series of apology have been tendered for failure to appear on the air.

Purpose of the Study

The study was designed to assess the maintenance of equipment, machine and other facilities in Nigeria Television station, Oyo. Specifically, the study:

(i)   ascertain how adequate is predictive maintenance carried out on transmission equipment and machine in the television station.

(ii)   determine how suitable is preventive maintenance carried out on transmission equipment and machine in the television station.

(iii)   determine the strategies that can enhance maintenance of transmission equipment, machine and facilities to satisfy the society.

Research Questions

Three research questions were formulated based on the three specific purposes thus:

(i)   How adequate is predictive maintenance of transmission equipment and machine being carried out at NTA Oyo?

(ii)   How suitable is corrective maintenance of transmission equipment and machine being carried out at NTA Oyo?

(iii)   What are the strategies that can enhance maintenance of transmission equipment and machine facilities at NTA Oyo?

Methodology

A descriptive survey design was adopted for the study since it involves the engineering staff of Nigerian Television Authority (NTA), Oyo and the activities been carried out in the maintaining of the television station purpose sampling method was adopted since it involves the engineering staff only in the transmission station.

The population of the study comprised all the 52 staff in Engineering section of the 10 existing transmission television station in Oyo State. Questionnaire was the instrument used for data collection. It contained a total of eighty-six (86) items drafted based on the purpose of the study and to answer the research questions posed for the study. The instrument was validated by two experts in the Department of electrical/electronic engineering Ladoke Akintola University of Technology (LAUTECH) Ogbomoso, Oyo State. The reliability test for internal consistency was carried out using Alpha coefficient and thus yielded a coefficient of 0.82. this indicated that the instrument was reliable for the purpose of the study.

The instrument was administered by hand with the help of two research assistants. A return rate of 92% was recorded. Analysis was done using a statistical package of mean. Any items with a means of 2.50 and above was considered as despondences adequate or suitable or agree and below was considered not adequate or not suitable or disagree**.**

Results

Research Question 1: How adequate is predictive maintenance of transmission equipment and machine are been carried out?

Table 1: Mean responses on how adequate is predictive maintenance of transmission equipment and machine carried out in the television transmission station.

S/N	Items	X	Remark
1.	Clean the body of instrument after use	2.5	Adequate
2.	Select correctly the frequency required	2.62	Adequate
3.	Adjust the transmitter to fit the station channel	2.76	Adequate
4.	Protect the encoder from dust	2.56	Adequate
5.	Adhere to the standards of equalizer effectiveness	2.52	Adequate
6.	Accurate setting of modulator	2.57	Adequate
7.	Consistently adhering to position of synthesizer	2.61	Adequate
8.	Earthling appropriately the transmitter equipment	2.78	Adequate
9.	Effect the metal contact part of the equipment	2.52	Adequate
10.	**Audio Mixer** Inspection and examination of the cables and selection knob	2.37	Not adequate
11.	Adjusting of the control knob or switches	2.52	Adequate
12.	Maintaining the regular voltage and current supply	2.63	adequate
13.	**Vision Mixer** Utilizing proper point with appropriate buttons	2.30	Not adequate
14.	Maintaining the proper connection rate during the transmission process	2.57	Adequate
15.	Consistently adhering to the use of protective device		
16.	Maintaining the constant Electrical Engineers regulations	2.52	Adequate
17.	Inspection and examination of earthling regulation	2.62	Adequate
18.	Maintaining appropriate brightness or intensity on the equipment	2.57	Adequate
19.	Constant checking of proper connection in line with colour coded-cable to appropriate terminals	2.72	adequate
20.	**DVD Machine** Proper contact of the cable terminals	2.33	Not adequate
21.	Consistently adhering to the use of cable rubber grommet where they enter metal-case	2.31	Not adequate
22.	Cleaning the moving part of the machine	2.33	Not adequate
23.	Adjust DVD machine to suite the production	2.51	Adequate
24.	Inspection of the output signal	2.57	Adequate
25.	Insert correctly the USB or memory card required	2.62	Adequate
26.	**Picture Monitor** Inserting correctly the monochrome required for the exercise	2.63	Adequate
27.	Utilizing proper point with appropriate feed	2.35	Not adequate
28.	Cleaning the appropriate part for the required performance	2.56	Adequate
29.	Adjust properly for accurate matching of the feed loads or input	2.61	adequate
30.	Consequently adhering to transmission code regulation	2.36	Not adequate
31.	Inserting the recording attachment for proper production	2.52	Adequate
32.	Maintaining the impedance, by carrying out the voltage measurement	2.32	Not adequate
33.	Reduce the appropriate control knob to obtain required picture	2.41	Not adequate
34.	Cleaning the tube and appropriate buses	2.60	Adequate
35.	Regulate the supply to the equipment	2.58	Adequate

Table 1 shows that the mean of items numbers 1, 2 ,3, 4, 5, 6, 7, 8, 9, 12, 14, 15, 16, 17, 18, 19, 20, 24, 25, 26, 27, 29, 30, 32, 35 and 36 exceeded the criterion level of 2.50 and their values lie between 2.50 to 2.72 which is considered adequate. While the mean items numbers 13, 21, 22, 31, 33, and 34. These depicts that the above factors are instrumental to in adequate predictive maintenance of television transmission in Oyo State.

Research Question 2: How suitable is corrective maintenance of transmission equipment and machine been carried out?

Table 2: Mean responses of Television transmission staff on how suitable is corrective maintenance is carried out on equipment and machine in a television transmission station

S/N	Items	X	Remarks
1.	Replacement of worn-out or burnt component parts with spare part	2.50	Suitable
2.	Correct use of synchronizer component	2.64	Suitable
3.	Remedy breaking of scanning component	1.87	Not suitable
4.	Correct earthing and arcing protection	2.00	Not suitable
5.	Correct catastrophic fire alarm breakage equipment	1.70	Not suitable
6.	Correct wrongly feed of frequency signal generator	2.13	Not suitable
7.	Correct wrongly position of sidebands carrier Frequencies	2.50	Suitable
8.	Correct wrongly fixed encoder attachment	2.13	Not suitable
9.	Remedy wrongly fixed or position equipment	1.92	Not suitable
10.	Correct position of modulator	1.83	Not suitable
11.	Correct installment of synthesizer	2.25	Not suitable
12.	**Audio Mixer** Correct poorly position of audio mixer	2.73	Suitable
13.	Prompt replacement of worn-out knob	2.13	Not suitable
14.	Correct the burnt socket plugs	2.62	Suitable
15.	Correct the sound detector unit	2.62	Suitable
16.	Correct the wrongly regular supply of voltage and current supply	2.53	Suitable
17.	Correct the wrongly generated vestigial sideband transmission	2.12	Not suitable
18.	Replace worn-out microphone	2.55	Suitable
19.	Replace the kink cord or cable strip	2.52	Suitable
20.	**Vision mixer camera** Replace the broken lens promptly	2.03	Not suitable
21.	Correct the scanning of a particular line	2.80	Suitable
22.	Tighten the loose screws on the camera case	2.10	Not suitable
23.	Correct the field pulse sent into the camera	1.95	Suitable
24.	Correct the interlaced scanning in the camera	2.55	suitable
25.	DVD Machine Repair minor faults	2.45	Not suitable
26.	Remedy the scan coil	1.90	Not suitable
27.	Correct replacement of Harmonic filter	2.80	suitable
28.	Picture monitor Reduction the light-brightness in the tube	2.55	Suitable
29.	Remedy the electron gun of a cathode ray tube	2.08	Not suitable

30.	Correct the interlaced scanning in the camera	2.06	Not suitable
31.	Overhaul the picture monitor	2.18	Not suitable
32.	Replace the USB cable in the monitor	1.90	Not suitable
33.	Overhaul video detector	2.09	Not suitable
34.	Correct the wrongly exist of video amplifier	2.61	suitable
35.	Remedy the video channel transmission	2.52	Suitable
36.	Remedy the synchronize separator	2.08	Not suitable
37.	Overhaul the line oscillator	2.00	Not suitable

Data presented in table 2 revealed that the mean of items number 1, 2, 7, 12, 14, 15, 16,18, 19, 21, 24, 25, 32, 33 and 42 exceeded the criterion level of 2.50 and their mean values lie between 2.50 aqnd 2.80 which is considered suitable, while the mean of items 3, 4, 5, 6, 8, 9, 10, 11, 13, 17, 20, 22, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 38, 39, 40 and 41. Their values lie between 1.70 and 2.48.   this shows that the above factors contributed to inadequate corrective maintenance of television transmission station by the engineering staff
.
Research Question 3: What are the strategies that can enhance maintenance of transmission equipment and machine facilities?

Table 3: Mean responses of television transmission staff on strategies that enhance maintenance of equipment ad machine facilities in Oyo state.

S/N	Items	X	Remark
1.	Ability of the manager to assist in solving maintenance problem	3.18	Agree
2.	Good management support by television station authority e.g. finance	3.00	Agree
3.	Clear definition of responsibility by management	3.10	Agree
4.	Engineering staff exhibit engineering expertise	2.94	Agree
5.	Formulation of ambiguous goals by the transmission authority	1.78	Disagree
6.	Employment of Electrical/Electronic experts in the television transmission station	3.04	Agree
7.	Create job opportunities for technician to acquire more skills	3.06	Agree
8.	Good reinforcement given to technician for workshop or job hazard allowance	3.02	Agree
9.	Good communication of maintenance requirement between technician and television station authority	3.11	Agree
10.	Promotional opportunities provided to technician by the government	1.57	Disagree
11.	Proper planning of maintenance schedule	2.92	Agree
12.	Professional recognition of technician staff by the government	2.80	

Data presented in table 3 revealed that the mean of items number 1,2,3,4,6,7,8,9,11,12,and 12 exceeded the criterion level of 2.50 and their mean values lie between 2.86 and 3.18 which is considered agree while the mean of items numbers 5 and 10 were below the criterion level of 2.50 their values lie between 1.57 and 1.78 which is considered disagree. This depicts that the both factors cannot enhance the maintenance of television transmission station in Oyo state.

Conclusion and Recommendations
Based on the analysis and findings, the technician at the Nigeria television Authority (NTA) transmitting station rarely pay attention to preventive and corrective maintenance of the

television station in Oyo state. The federal government of Nigeria should be wiry that information is very important and delayed in rightful information through the appropriate channel is dangerous to our society, therefore, all necessary spare part should be adequately provided, among other maintenance, operation and maintenance should be handled with all seriousness, and value engineers should be employed and positioned at all existing television transmission station who will carry out the costs, consistent with specify performance maintainability, aesthelics, safety and security criteria.

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