Maintenance of Vocational and Technical Education Workshop Tools and Equipment: An Effective Strategy for Educational Growth and National Development

By

[1]Owodunni, A. S., [2]Baba, A. A., [3]Doma, Y. S. [4]Simeon, S. A., & [5]Onatunde, E. K.
[134]*Department of Industrial and Technology Education,*
Federal University of Technology Minna, Niger State.
[2]*Department of Electrical Engineering*
Federal Polytechnic Bida, Niger State
[5]*Department of Vocational Teacher Education*
University of Nigeria, Nsukka.

Abstract

Workshop tools and equipment are very important to the successful implementation of any Vocational and Technical Education programme. In all work and study places, maintenance is needed in order to keep the equipment in good working conditions. This paper has made an attempt to address maintenance as it relate to Vocational and Technical Education workshop tools and equipments and how it affects teaching and learning. Other issues examined include the concept of maintenance and maintenance culture in our society, the value for proper maintenance of workshop tools and equipment in Vocational and Technical Education. Lastly the paper observed that the major problem faced by Nigeria today is how to imbibe maintenance culture into our daily life in order to promote growth in the education and other sector of the economy. Consequently, it was recommended that government should carry out on enlightenment campaign on the need for maintenance culture in our schools and colleges and society at large.

Introduction

In most learning and work situations, appropriate maintenance procedure is known to have prolonged the life span of the equipment in all aspect of technological endeavors. In mechanical technology, for instance, the milling or shaping machine can easily be discarded because the spindle is broken or that the carriage is more flexible. In this case, a maintenance procedure is undertaken by casting the broken part, machining and refining it for fresh use; thereby reactivating the machine and restore it to its operational standard. This type of repair can also be carried out in other disciplines, with the local production of good quality spare parts to replace worn out or damaged ones, the life of the machine is prolonged and there is enhanced productivity as a result of effective management. It becomes very necessary, therefore that Vocational and Technical institutions teachers, workshop attendants and factory staff should be equipped with adequate maintenance education, procedures and strategies, to ensure strict adherence to the much needed maintenance culture useful for effective management of resources in the workshop. This is also important for educational growth and industrial revolution.

Concept of Maintenance

Maintenance is a deliberately planned action specified by the manufacturers. It involves planned supplying of necessary material for the continued operation of the equipment of the appropriate and timely steps and precautions taken to ensure that a given piece of equipment or other form of capital asset attains maximum life span (Orikpe, 1994). Maintenance is a way of repairing or servicing used equipment in order to make for enhanced functioning. Maintenance involves the continued sustenance of equipment operation whereby it is not effected regularly it may lead to break down or failure which also result in major damage that opts for repairs or services. Uzoagulu (1992) emphasize the need for the equipment and facilities to be well maintained if the needed skilled manpower arc to be produced on a sustained basis According to Olaitan, Nwachukwu, Igbo, C.A. Onyemachi and Ekong (1999) pointed out that maintenance means taking specific approved steps and precautions to care for a piece of equipment Machinery or facility and ensure that it attains its specific maximum functional shelf life. Olaitan et al. identified three common types of maintenance practices as preventive, predictive and corrective maintenance.

Preventive Maintenance is a type of practice that involves inspection, lubrication, cleaning and testing of an equipment or facility used in a workshops. It is a task carried out with operational stuff in the factory or laboratory. This type of maintenance does not wait until the machine equipment or infrastructure has collapsed or broken down before being attended to; the effort is rather to prevent a break down.

Predictive Maintenance is concerned with application of useful strategies to forestall a breakdown when danger signals are observed. In this circumstance, it means that when danger or signal are observed in the operation of equipment or machines an immediate intervention is necessary to arrest the situation and to prevent the equipment from breaking down. The speed and accuracy with which the maintenance intervention is carried out determines the extent to which a breakdown of a machine or equipment is fore stalled.

Corrective Maintenance involves approaches for rectifying an already damaged or breakdown equipment or machinery, steps to be taken may be replacement of already damaged parts or repair and servicing and production framework.

Present State of Vocational and Technical Education (VTE) Workshop Tools and Equipment

The school workshops offer chances for practical training of students in the acquisition of skills in different trade areas. According to Puyate (Umar and Ma'aji, 2010) the present state of facilities in VTE institutions is very poor, there is no planned measures of maintenance of the already broken down equipment or means of acquiring new ones, there is hardly or no concern on the part of government, teachers and students for the development of the present state of the facilities. This pathetic condition needs to be reverted in order to meet the goals of VTE as stipulated by the Federal republic of Nigeria (FRN) in the National Policy on Education of Nigeria (FRN, 2004:30).

According to the policy, the goals of VTE; shall be to provide trained manpower in the applied sciences, technology and business particularly at the craft (equivalent of high schools), advanced craft and technical levels; provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; to give training and impart the necessary skills to individuals who shall be self-reliant economically. This laudable objectives can only be achieved through a curriculum that is relevant and comprehensive and a well–equipped workshop with relevant tools, equipment and other training facilities. Afeti (2007) stated that, the quality of training in VTE institutions in Nigeria is low with undue emphasis on theory and certification rather than on skills acquisition and proficiency testing. Inadequate instructor training, obsolete training equipment and lack of instructional materials are some of the factors that combine to reduce the effectiveness of training in meeting the required knowledge and skill objectives. High quality skills training requires qualified instructors, appropriate workshop equipment, adequate supply of training materials and practice by the learners. In a study conducted by Onyene, eta'l., (2007) on the production of skill-oriented graduates for the labor market the study revealed that the available physical and material resources used in teaching VTE is grossly inadequate.

In the same vein Ayua (2006) in a study on consolidating and sustaining industrial performance of school product in VTE for national development revealed some findings on the availability of teaching equipment and material resources thus; there were no standard workshops with adequate facilities for carpentry and joinery in four out of five technical colleges under the study and where they are available they are not properly maintained. Many workshop tools like plough planes, rebate planes, compass planes, tenon saws, bench vices etc that are pre-requisite for use in National Business and Technical Examination Board (NABTEB) practical examination (Ayua, 2006:37) Regular supply of electricity is one other major resource input that is essential in all facets of the economy to boost the much required technological advancement of the nation.

Maintenance Culture and VTE Tools and Equipment

Maintenance culture involves activities such as

1. Repair routine: checks equipment, machinery and facilities, ensuring adequate cleaning and lubrication.
2. Proper storage system and good inventory
3. Making adequate checks when there are danger signal
4. Prompt repair of equipment, machinery or facilities
5. Strict compliance to the operational guidelines of the equipment and machinery.
6. Good self conduit while at work.

There are activities when practiced in workshop, laboratory or factory will facilitate the Respect for honest labour and strengthen the ideals of the dignity of labour. Maintenance culture involves the acceptance of any society or community to practice maintenance as an integral aspect of her philosophy. Citizens of that community will be expected to accept that:

1. There is no end to which a piece of equipment or machine will be put to use if maintained.
2. The equipment or machine should be aided to exhaust it nature life span.
3. it is an economic sabotage to allow an equipment to breakdown before it is attended to or taken care of
4. every warning signal in any equipment or machine must be at attended to promptly;
5. Every individual should be personally responsible for any equipment left in his care.

Any community that enthrones in her culture maintenance practice such as prompt repair of equipment and infrastructure, production or procurement of spare parts for maintenance, the ideals of dignity of labour, emphasis on the acquisition of vocational skills, will experience and exhibit competency in research and experimentation which are essential attributes and features of communities with efficient maintenance culture. Every individual in such a community will be committed to the ideals of the community maintenance culture not by compulsion but through a consensus of values. The primary objective of a maintenance programme is not just to repair a broken down piece of equipment but to ensure that the production system operates at a functional and an acceptable level capable of sustaining efficient production. In an effort to encourage and guarantee effective maintenance procedure, six preliminary approaches to maintaining laboratory and factory equipment have been identified by Browner (1997). These preliminary approaches include;

i. The vendor- construct approach, whereby the equipment supplier sells a contract to maintain the equipment for a given period of time.
ii. The vendor- per call approach, whereby the vendor supplies the equipment and is paid for time and material consumed.
iii. The third party contract, whereby the third party is paid for time and material used.
iv. The in-house approach, in which the maintenance is done internally by the organization or institutions that own the equipment. This type of maintenance has the advantage of prompt attention being given to the machine or equipment and low cost potential. However, these advantages may be achieved if the organization has high quality personnel and adequate supply of spare parts.
v. The strength of this approach is that it eliminates most of the weakness of others.

Mbata (1990) observed some equipment in our workshops is substandard and poorly maintained. Oduh (1992) attributed lack of maintenance to non-chant attitude of roost Nigerians towards government property; inability of equipment operators to effect minor repairs, lack of periodic checks of the equipment, poorly trained technicians to affect the repairs and lack of spare parts and funds.

Oduh (1993) carried out a study on "cost and maintenance of equipment in vocational Business Education implication for self-reliance". The study revealed that equipment supplied to schools was ill maintained due to:

a. Laissez faire attitude of some individual towards government property.
b. Inability of the operators to effect minor repairs
c. Lack of weekly or monthly checks of the equipment
d. Poorly trained technicians to repair the equipment and
e. Lack of spare parts.

Ekenze (1991) noted that imbibing maintenance culture would help reduce cost of purchasing new equipment and prevent wastage. Ekenze maintained function more effectively; increase in skilled manpower production and economic stability will be prompted. Ogwo (1998) noted that keeping a shop laboratory in suitable condition for industrial purposes; sharpening, adjusting and repairing broken tools and equipment. It becomes the responsibility of the teacher to keep the equipment in good condition for effective use. A very important responsibility of the teacher is to instill in students a high respect for the equipment/facilities in the workshop. This is in line with the thought of Giachno et al (1977) that a noticeable trait of good craftsman is the reverence he has for equipment. If the similar attitudes to students, they will produce better work, and equipment breakage will be substantially reduced.

Development of good habit of equipment facility care is very important because teacher should recognize that facilities are in poor condition. Giachno et al (1977) opined that students will become discouraged if equipment to be used are dull, broken or generally nor in operative. They further posited that every laboratory teacher should have well defined policy for facility maintenance and follow it consistently. They said that facility maintenance policy should answer the following questions.

1. How often should equipment/ facility be reconditioned?
2. Should student assume some of the responsibility for sharpening tools?
3. What should be done if a tool is broken?
4. What measure should be taken to prevent tool rust?

Workshops are potentially dangerous places and only constant vigilance and insistence on efficient working techniques by all those using it can ensure that accident will not occur.... and even then one needs a little luck (Oranu 1995). Emphasizing the risk of using laboratory, Nurry (1977) said; No experiment especially those using chemicals are even perfectly safe, but intelligence and knowledge greatly reduce the chance of any serious accidents. For safety of everyone concerned, a strict discipline must be maintained in the laboratory by the lecture of demonstrator in charge of the class.

Famiwole (1997) pointed out that a strict compliance with standing workshops in vocational training colleges or centres should be insisted upon. Famiwole also insisted that cleanliness and orderliness are some of the safety standard desirable in the workshops or laboratory. Gay in Ezike (1997) suggested the appointment of safety officers and the provision of adequate notice boards where safety rule may be prominently displayed. Although he recognized that verbal instruction is more effective than printed notice. In consonant with the above, Abdullahi (1979) suggested supervision training, prior to the start of each semester. Safety committee should bold a mandatory safety seminar for new teaching assistants. Abdullahi also suggested that students are instructed on safety in workshops, factory or laboratory. According to Abdullahi students should receive specific safety instruction before every training or teaching period. He suggested that each student be given two copies of the safety rules to be followed in the place where they carried out their daily activities like practical or projects.

Famiwole (1997) also observed that there is need for all personnel to realize that safety is an attitude, a frame of mind that must be with each and every moment. It is only then we can be sure that we have done jobs. He warned that safety should not be taken for granted and that both the students and the staff should have sufficient information about the safety of themselves and the equipments they are working with also they should constantly be reminded of safety practices. Safety conscious teacher is one who is aware of potential hazards and who takes appropriate preventive measures when planning his lesson.

A well conceived and implemented maintenance culture in training centres, workshop or laboratory is a reinforcing activity that ensures continuity within the production system. To ensure the maintenance culture is consistent in our laboratories, the management should comply with the following.

a. Ensure that regular maintenance activities are carried out in the laboratories
b. Organize work-study training programme for their problem-solving ability and skill.
c. Provide adequate fond for maintenance purposes in the Laboratories
d. Ensure proper supervision of the activities of the workers in the laboratories
e. Organize seminars and workshops on maintenance issues in the laboratories.

Conclusion

Major problem faced by Nigerians today is how to imbibe maintenance culture into our daily life. Government properties are wasted due to lack of proper maintenance. Educational institutions and Government agencies are decaying due to improper maintenance and many companies and factories have closed down because they cannot maintain their equipment and facilities properly. Ekenze (1991) observed that imbibing maintenance into our culture would help reduce cost of purchasing new equipment, prevent wastage in our education sector and other sector of our economy and it is therefore very important for the Government and those that are concerned to instill in our students, the factory staff and society at large a high respect for the equipment/facilities in the workshop, government and individual properties and infrastructures

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