

**THE ROLE OF PROFESSIONALS IN EFFECTIVE FACILITIES
MANAGEMENT AND MAINTANANCE.**

BY:

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ABSTRACT

The paper is focused on the relevance of facility maintenance and management viz-a-viz the role of professionals in ensuring that maintenance principles for Engineering facilities are strictly adhered to, in other to ensure that such facilities work efficiently. For a nation to meet the UN Millennium Development Goals, emphasis must be placed on the manufacturing industry, hence the need to establish a maintenance culture which will guarantee continuous production. The paper is anchored on the relevant maintainability criteria's and the methods employed in performing such functions. Also highlighted are the different types of maintenance needed to increase the life span of equipment or machine as it will also go a long way to increase the level of production. Factors militating against proper maintenance / management of equipments were highlighted and the ways forward were suggested.

KEY WORDS: Professionals, maintenance, management, servicing, FMEA.

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1.0 INTRODUCTION:

Most underdeveloped economies have natural resources but they are not able to develop the technologies required to add value to this resources, thus they remain in abject poverty. It is in order to stem the tides whereby most of the world's population lives in abject poverty and a few swims in wealth that the UN declares the MDGs. - Millennium Development Goals. The success of this laudable programme depends on the existence of a sustainable Engineering infrastructure base which will provides among others the needed machinery and facilities for a production based economy. (1)

The life wire of an industry in the drive to achieve continuous production depends on the efficiency of the available machines and other equipments, hence the need for proper management and maintenance of such equipments and, machines. Good management principles which are basic ingredients to increase the life span of a machine must be established. Maintenance refers to the act and practice of keeping equipment or a machine in the best working conditions. The concept of maintenance simply means taking appropriate steps and precautions to ensure that a given piece of capital assets, equipment and machinery, attain there maximum possible life span. (Olaitan, 1998). Equipments or machines (Facilities) management on the other hand refers to "The integration of processes within an organization to maintain and develop the agreed services which support and improve the effectiveness of its primary activities" (European Committee for Standardization, and ratified by British Standards). Management of equipments and machines can also be refers to as "The integration of multi – disciplinary activities within the built environment and the management of their impact upon people and the workplace". (British Institute of Facilities management). Equipments and

machines management and maintenance is a vital issue in the manufacturing industry, since they play a vital role in ensuring continuous production. The issue of management and maintenance of equipments require that one must have a thorough understanding of the equipments and machines hence the role of professionals (2)

2.0 OBJECTIVES: (ROLE OF PROFESSIONALS).

The practice and principles of properly managing and maintaining facilities is geared towards achieving the following objectives: (1)

- To ensure safety of life's, of equipments and machinery and other facilities.
- To achieve minimum breakdown and to keep facilities in good working conditions at the lowest possible cost.
- To achieve optimum profit without any interruption or hindrances.
- To maintain the value of facilities by periodic inspection, repairs and overhauling.
- Finally maintaining the equipment / machines and other facilities optimum production capacity.(3)

3.0 WHO IS A PROFESSIONAL IN EFFECTIVE MANAGEMENT / MAINTENANCE OF FACILITIES?

Professionalism is a very important criterion when it comes to the issue of handling equipments, machines. The machine operator for example ought to have full understanding and knowledge of the machine his to operates, this will not only reduces the occasional break down of such equipment it will also minimize the chances of accident occurring during such operation. A professional therefore is no other person than the equipment or machine operator viz a viz the plant Engineer, who understand the in and out of the equipments. (2).

He knows the working principle of the machine more than any other person and can proffer solution any time there is breakdown of such equipment or machines. The “know how” of facilities i.e. knowledge about there working principles can be acquired via:

- Education / Technical training.
- On the job training.
- Apprenticed
- Seminars / Workshop.

Summarily, professionalism in facilities management and maintenance includes among others: (4)

- * Having knowledge of the structure / function of a typical maintenance programme.
- * Understanding of the mitigating factors against an effective maintenance programme.
- * Having knowledge of the various types of maintenance programme required to keep facilities in the best working conditions. (3)
- * Understanding of the factors militating against an effective facilities management / maintenance frame work.
- * Being able to give critical suggestive frame work as to how an effective facilities management / maintenance frame work can be achieved. (1)
- * Having absolute knowledge of the various components of engineering facilities and the various stake holders involve in the management / maintenance of engineering facilities.

4.0 TYPICAL MAINTENANCE PROGRAMME

The maintenance programme itself can be considered to consist of the following among others (2)

- A group of set of defined actions to be taken at specific intervals. These are the routine jobs associated with schedule maintenance and the one – time jobs associated with modification of equipments, its sub – system or its components.
- A set of corrective actions which results from the set of defined actions in (1) above or from reports of obvious malfunction of the equipments, its sub – systems or its components.

The objectives of the maintenance programme may include among others:

- To keep equipment; operating for percentage of the time.
- To keep equipment in good working conditions
- To manage the maintenance division so as to obtain minimum total operating cost.(5)

Arising from the above, it can be observed that the actions in a typical maintenance programme should include:

- Servicing.
- Inspection.
- Repair.
- Testing.
- Calibration.
- Replacement with new parts.
- Replacement with overhauled parts.

- Modification,

4.1 BASIC REQUIRMENTS FOR MAINTAINANCE PROGRAMME TO SUCCEED.

- **RECORD KEEPING.**

Record keeping is a very essential part of a good maintenance set up but it should not be burdensome and only useful records should be kept. It is important to ensure that these records are kept up – to – date and not just when one has the time. There should be minimum number of essential forms and entries as detailed below. (2)

(a) Inspection Manual:

A typical inspection manual should tell how to install, operates, what materials and tools to use and what safety measure to take. It should devote a separate page to each kind of equipment index for easy and quick reference. (2)

(b) Basic Forms.

The following are a few of the basic forms for maintenance work which are required for an effective maintenance programme;

- Equipment record.
- Check list/chart
- Inspection schedule.
- History sheet / inspection report.
- Equipment and maintenance cost report.

- **SPARE PARTS PROVISIONING.**

A good number of maintenance programmes cannot succeed unless they are supported by dynamic and effective spare parts provisioning policies, whether the maintenance to be

carried out is that of breakdown or not, a relevant factor that will determine the level of success achieved is the availability of the spare parts needed to effect the necessary repairs. Consequently, the problems of managing or stocking spares for repair work are real. (6)

5.0 TYPES OF MAINTENANCE.

Maintenance carried out on equipments and machines is either:

- Break down maintenance.
- Schedule maintenance
- Preventive maintenance or
- Predictive maintenance.

5.1 BREAK DOWN MAINTENANCE.

Maintenance which is carried out after a piece of equipment or machine is out of order is termed breakdown maintenance. Under such conditions the maintenance department is informed of such equipments failure e.g. an electric motor will not start or a belt is completely broken. Repairs are done after a certain mean time. Under breakdown maintenance policies; the maintenance department will not attend to such equipment or machine until another failure is reported. This kind of maintenance practice is normally seen in small scale industries. (3)

5.2 SCHEDULE MAINTENANCE.

Schedule maintenance is a stitch in time practice of maintenance. "A stitch in time saves nine". It is aimed at avoiding equipment breakdown. This kind of maintenance culture includes among others: equipments / machines inspections; lubrication of moving parts; minor repairs and overhauling of near failure parts e.t.c. (2)

5.3 PREVENTIVE MAINTENANCE.

This kind of maintenance practice is based on the underlying principles that prevention is better than cure. Preventive maintenance is very effective for equipments that are subject to progressive deterioration but relying as it does on regular testing. Preventive maintenance locates weak spot; such as parts under prolong vibrations; it also minimizes the resulting problems of facilities break down. (1)

5.4 PREDICTIVE MAINTENANCE.

In predictive maintenance, facilities (equipments and machinery) are normally checked on day to day basics, allowing for checkup, adjustment, repairs and modification of such facility. It is normally recommended for equipments / plants whose failure can result in serious tragedy, such as nuclear plant. (6)

6.0 STEPS IN EFFECTIVE MANAGEMENT / MAINTENANCE OF EQUIPMENTS/MACHINES;

6.1 NON WORKING MACHINES / EQUIPMENTS.

- **MAINTAINABILITY SURVEY.**

This kind of survey is normally carried out by a team of expert (professionals), having knowledge of the working principles of the equipment/ machines under survey. Maintainability concept refer to the probability that when maintenance actions are initiated under stated conditions , a failed equipment or machine will be restored to operable condition within a specified time. The main criterion for equipment maintainability is that the equipment/ machine must have parts which are readily available and cost effective; repair mean time should be minima. Maintainability criterion has to be defined and possibly incorporated into the design stage of the equipments. (4)

- **DETAILED DIAGRAMS / MAPS.** A detailed diagram of the components to be corrected is usually needed- it defines the extent of damage of the components, it also indicates among others the fault locations, isolation and possible near failure points. (1)
- **PREDICTIVE ANALYSIS.** This is aimed at equipments or machines dependability. Predictive analysis such as FMEA (Failure mode and effect analysis) is normally carried out during maintenance to identify the causes of all possible items failure. The analysis provides imputes to the maintenance team by identification of the failure modes, their frequency of occurrence and the possible

maintenance actions required. The relevance of FMEA in equipment maintenance cannot be overemphasized as it serves as basics for design and location of condition monitoring and fault sensing devices and development of automated test and diagnostic procedures aimed at minimizing corrective maintenance downtime. (4)

- **FINAL REPAIR.** Here faulty equipments components are either repaired or replaced completely.

6.2 WORKING EQUIPMENTS.

***TURN AROUND MAINTENANCE.**

This are the type of maintenance practice carried out at yearly basics or at interval of every six months. The practice is aimed at total repair or overhauling of the most vital components of the equipment due to prolong working. It is anchored on increasing the life span of the equipment or machine. The operation is normally carried out by a team of expert. (5)

*** EQUIPMENT / MACHINES SERVICING.**

Whereas turn around maintenance is down every year of every six months, servicing of equipments are normally done much earlier say on monthly or weckly basics. It involves among others such operations like cleaning plugs, changing valves, oil filters, air filters and lubrication of moving parts.

*** ROUTINE MAINTENANCE.**

It is the day to day checking of the machine. The operation is carried out on daily basics to maintain the efficiency of equipments and machines.

7.0 FACTORS MILITATING AGAINST EFFECTIVE FACILITIES MANAGEMENT / MAINTENANCE.

This include among others;

- * Unavailability of spare parts.
- * Maintenance cost.
- * Lack of Technical Know How.
- * Lack of man power.
- * Poor maintenance programme.

8.0 THE WAY FORWARD.

- * Staffs can be sent on training to improve their knowledge and technical ability.
- * Employment of new personnel; this should be base on real technical back ground.
- * Seek financial assistance from government, corporate organization and other non governmental organization.
- * Professionals should be involved in the formulation of maintenance policies and programme. (6)
- * Professionals must take it as their responsibilities to fabricate equipments spare parts to alleviate the problems of unavailability of equipments / machine parts.

9.0 CONCLUSION.

For the proper maintenance of equipment and machines, the following points are relevant;

1. Inspection should be carried out at schedule intervals throughout the production processes.

2. Negligence of minor or small faults must be avoided.

3. Preventive and predictive type of maintenance is always advisable to avoid breakdown of equipment and machines.

10.0 REFERENCES.

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- O.O.Adewoye, (2005) Development and Maintenance of Nigeria Engineering Infrastructures.(4)
- Dieter G.E, Engineering Design, A material and processing approach, first edition, McGraw Hill Book, 2001. (5)
- NASENI, 1992, National Policy on Science and Engineering Infrastructures. National Agency for Science and Engineering Infrastructures. (6)



**Shell Petroleum Development
Company of Nigeria Limited**



Hyundai Heavy Industries, Co.,Ltd.
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BTIP - ONSHORE FACILITIES/OFFSHORE PIPELINES

CONTRACT NO: E-09335
Reference No: SUL/HON-L-EL-0034
Your reference No: HON/SUL-L-EL-0028

Date: 25 June 2003

Attention: Mr. Y.B. Kwon / Project Director

Subject: Technical Clarification Meeting for MV Switchgear & Control Gear

Dear Mr. Y. B. Kwon,

Further to your above reference letter and our conversation with your Mr Y C Kim of 23rd June, due to non availability of the SPDC Discipline Engineers, please postpone and reschedule the meetings with the Vendors to commence in July 2003.

Please advise the revised meeting schedule when it has been firmed up with the Bidders.

Yours sincerely,
For and on behalf of
**SHELL PETROLEUM DEVELOPMENT COMPANY
OF NIGERIA**

J C Okoro

J C OKORO/Lead Resident Engineer

Reply Required	
Yes	No
X	
By: 30 Jun 2003	

DISTRIBUTION	
Project : BTIP	
Date : 2003.6.26	
BTP DCC	
Resp.	SP/INF
Project Director	✓
Project Manager	
Engg Director	✓
Bonny P.M.	✓
E.M	✓
O.M	✓
PPM.	
Sch.Mgr	
Cont.Adm	
MHI-PHC	
Bonny Site	
Off-Shore	

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Sign: *[Signature]*



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**Hyundai Heavy Industries, Co., LTD.
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BTIP - ONSHORE FACILITIES/OFFSHORE PIPELINES

CONTRACT NO: E-09335

Reference No: SUL/HON-L-EL-0033

Date: 18 - 06 - 2003

Your reference No:

Attention: Mr. Y.B. Kwon / Project Director

SUBJECT: Additional Comments – Technical Bid Evaluation of Electrical Equipment

Dear Mr. Y.B. Kwon,

We refer to the Technical Bid Evaluation Reports on Distribution Center, MV Switchgear and Control gear and Load Management & Load shedding System.

Though ABB, SIEMENS and HOLEC are on the PMVL, their approved manufacturing locations are also specified. Products from any manufacturing locations other than that specified on the PVML constitutes a change and is subject to our review and approval through the Project Change Control process. Therefore acceptance of bids from these non-compliant locations is subject to approval by the Project Change Control Panel. Please submit all necessary documents for our review.

While this requirement is applicable to all electrical equipment, the currently identified equipment are (1) Distribution Center (2) MV Switchgear and Control gear (3) Load Management System.

The review status of these TBE Reports is now status three (3).

Yours Sincerely,

For and on behalf of

SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA

J.C. Okoro/Lead Resident Engineer

DISTRIBUTION	
Project : BTIP	
Date : 2003. 6. 18.	
BTIP ECC	
Resp.	AC/INF
Project Director	<input checked="" type="checkbox"/>
Project Manager	<input type="checkbox"/>
Engr Director	<input checked="" type="checkbox"/>
Senior P.M	<input checked="" type="checkbox"/>
P.M	<input checked="" type="checkbox"/>
C.M	<input type="checkbox"/>
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HI-II-PHC	<input type="checkbox"/>
Bonny Site	<input type="checkbox"/>
Off-Shore	<input type="checkbox"/>

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Sign:

Replics are required.	
Yes	No.
X	
By : 25 th June 03	

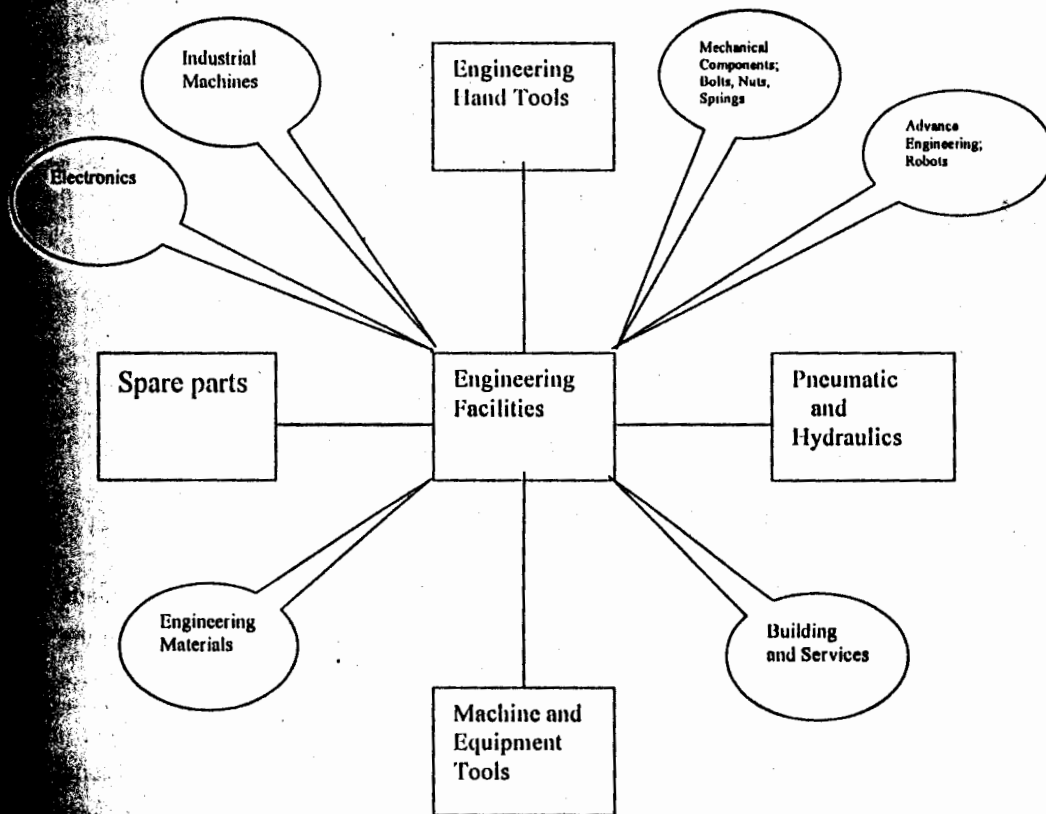


Fig. 1: Components of Engineering Facilities.

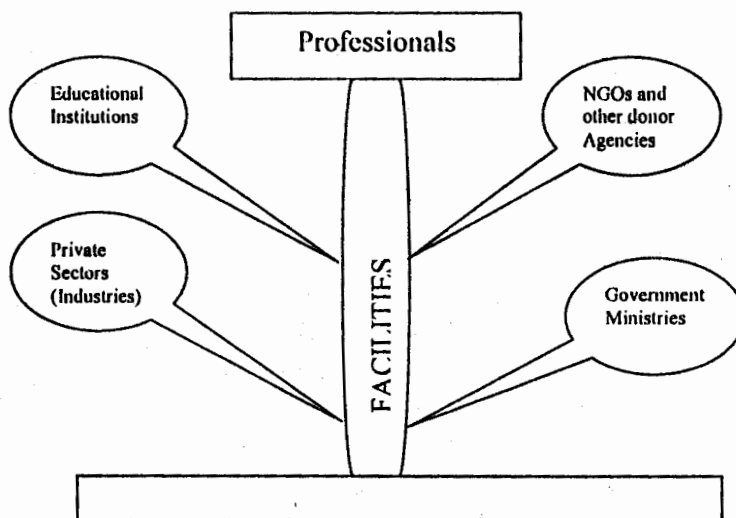


Fig. 2: Stakeholders in facilities Management/ Maintenance



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CONTRACT NO: E-09335: - BTIP ONSHORE FACILITIES/OFFSHORE PIPELINES

SPDC Ref. No: SUL/HON-L-EL-0032

Date: 5th June 2003

HHI Ref. No: HON/SUL-L-EL0023

Attention: Mr. Y.B. Kwon / Project Director

SUBJECT: AC & DC UPS EQUIPMENT SIZES.

Dear Mr. Y.B. Kwon,

We refer to your letter HON/SUL-EL- 0023 of the 30th May 2003. Following our joint review of the UPS loads lists and calculations; we recognize the need for increase in the sizes of the UPS units as detailed in the breakdown attached to your letter.

While we agree with the technical requirement, we like to state for the records that the bulk of the additional UPS power requirement stems from the auxiliaries of the new Gas Turbine Generators and the Process Automation System (PAS).

We would require you to advise the cost implications and manage them alongside those changes associated with the GTG and the PAS systems respectively.

Yours Sincerely,

For and on behalf of

SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA



J. C. Okoro / Lead Resident Engineer

DISTRIBUTION	
Project : BTIP	
Date : 200 . . .	
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Resp.	ACT/INF
Project Director	<input checked="" type="checkbox"/>
Project Manager	
Bonny P.M.	<input checked="" type="checkbox"/>
E.M.	<input checked="" type="checkbox"/>
Q.M.	
PPM	
Sch.Mgr	
Cont. Adm	
HSE-PHC	
Bonny Site	
Off-Shore	

RECEIVED
2003. 6. 09
Sign: *Hyaw*

Replies are required.	
Yes	No.
	X
By : Muiyiwa Falade	