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# PREVALENCE OF FACTORS AFFECTING MAINTENANCE MANAGEMENT OF PRISON FACILITIES IN SOUTH-WEST, NIGERIA.

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**Abstract:** The prevalence of diverse factors affecting maintenance management determines the impact of such factors on the maintenance of prison facilities. This study investigates factors that affect the maintenance management of prison facilities in South-West, Nigeria. Questionnaires were used to collect data from the prison staff in the maintenance unit of all prisons situated in South-west, Nigeria. The statistical tools employed for the study were percentage, mean scores, kendall's coefficient of concordance test of agreement. Result showed that deterioration due to age of facilities, overcrowding, inadequate plant and equipment for maintenance operations as well as inadequate training and development for prison maintenance staff are critical underlying factors. This result enabled the maintenance unit to identify the predominance factors. The study acknowledged the predominance barriers to implementation of satisfactory maintenance management. For better management of maintenance of prison facilities; study recommends that the government should provide all necessary maintenance and capital resources. Such as sufficient maintenance budgets, plant and equipment for maintenance operations and enabling policies that would ensure functionality of prison facilities.

**Keywords:** Factors, Maintenance Management, Prevalence, Prison Facilities, Prison Staff.

## 1. INTRODUCTION

### **Nigerian prisons service operations**

The Nigerian prison service operates under CAP 366 Law of the Federation of Nigeria 1990 to keep in custody those certified to be kept by courts of competent jurisdiction, to identify the causes of their anti-social dispositions and provide treatment and training to allow for integration of such into society after release ([www.prisons.gov.ng/organogram/work.php](http://www.prisons.gov.ng/organogram/work.php)). Prison facilities are to provide a safe and decent environment for prison staff and prisoners to work and live in, as well as for all others who interact with the prison facilities (Prison Service Technical Order [PSO] 5900 & 5901). Beyond these functions, prison facilities are to create an environment that supports the prison service objectives. That is, reformation, correction and rehabilitation of prisoners. To sustain these functions it becomes imperative for the Nigerian prison service to put in place a structured maintenance management system. That is capable of providing the right tools, equipment, maintenance materials, technologies, manpower (Pun, Chin, Chow and Lau 2002) and methodologies of carrying out maintenance activities on prison facilities.

This structured maintenance management optimises the use of available maintenance resources. It involves the utilisation of manpower to attain the desired objectives of keeping the prison facilities in a safe condition and avoid the need for potential expenses and disruptive repairs which may damage the facilities (Pun, et al. 2002; Sodangi, Khamdi, Idrus, Hammad and Umar, 2014). However, there are factors that militate against the maintenance management of the Nigerian prison facilities.

## 2. LITERATURE REVIEW

Like any other establishment, the Nigerian prisons service should perceive maintenance management as an essential function classified as non-core activities that support its core (rehabilitation and reformation) business (Siu, Bridge and Skitmore 2001). Institutional facilities should be managed and maintained properly to ensure the functioning of the facilities and to reduce maintenance cost by carrying out an appropriate maintenance programme that could extend the life cycle of facilities while providing a safe environment for the users (Abdullah Sani, Mohammed, Misnan and Awang 2012; Hamzah and Kobayashi 2013).

Agomoh and Oghozor's (2006) assessment of the Nigerian prison system revealed that the system has failed in security, reformation, rehabilitation, re-integration and revenue generation. It appears these failures could be associated with the state and availability of the prison facilities to perform the functions for which it is designed, used or required to be used. In the year 2008, the Minister of Internal Affairs, during the inauguration of Suleja Prisons, disclosed the Federal Government's intention to undertake a massive reform of the nation's prison system in a bid to address the observed decadence and to improve prison facilities across the Country. Such decadency in prison facilities affects the inmates whereby they are exposed to developing sick building syndrome (itchy skin, headaches, stuffy nose etc.) due to low level of inmates control over ventilation, poor standard of cleanliness and lack of repairs in the cell blocks (Health and Safety Executive [HSE] 2000) and the maintenance of the facilities.

Prison facilities maintenance is not being carried out according to actual maintenance needs due to poor funding on the part of relevant authority. This has serious implications for economic and social development (Yahaya 2012). Zubairu (1999) affirms that maintenance problems have been worsened by the uncaring attitude of users of public facilities having an impression that the maintenance of public facilities is the sole responsibility of the government. The conditions of sanitary and sewage facilities impede the health of the inmates (PRAWA 2000). Poor prison facilities, structural failure of facilities, and inadequate security features are most likely or could most time result in prison break as evident in the Nigerian prisons. Several cases of prison breaks have been reported between 2009 and 2014. This has resulted in the escape of over 2000 prisoners across the Nigeria prisons (Wikipedia 2016).

By late 1980, the Nigerian Prison Service was housing 58,000 inmates in facilities designed for 28,000 inmates (Library of Congress Country Studies; CIA World Factbook 2005). Subsequently, there was a decrease in the prison population by 2010, with 47,628 inmates out of which only 1,300 were convicted while the other 34,328 were awaiting trial (Nwezeh 2010). This showcases the defectiveness of the judicial system handling matters relating to prisons service. Despite efforts by the Federal Government for reforms, in 2014 the population of Nigerian inmates rose to 53,100 (Ohia 2014). Congestion of prisons takes its toll on inmates, the prison system, prison facilities and the society at large, causing premature obsolescence of the few facilities that are grossly inadequate for prison service ("Prison of Horror" 2000).

According to "Prison of Horror" (2000) Nigeria prisons face numerous challenges related to maintenance of facilities. These include: lack of potable water, inadequate and unwholesome sewage facilities, insufficiency of bed spaces, appalling state of sanitation, and inadequate plant and equipment for maintenance operations. Besides these, there is also a paucity of facilities compared to the population of inmates (Ayuk, Emeka and Omono 2013). Additionally, predominant problems that pose a threat on maintenance of prison facilities are administrative bottle neck ("Prison of Horror" 2000), bureaucracy, paramilitary nature of the prisons service, and inadequate government subvention. Such that maintenance of facilities is confined to the

budget rather than budget being derived from maintenance needs for public buildings (Adenuga 2014).

Other challenges could arise from the absence of a prompt trial of inmates awaiting trials ('Prison of Horror', 2000), overcrowding, conditions required for bail, deferred maintenance and high intensity of usage. Olubodun (2001) explains that users' (inmate and prison staff) characteristics (personalities, lifestyle and attributes) exert a significant influence on maintenance needs. The study further claims that users' maintenance needs vary according to building type and its use. This suggests the magnitude of maintenance needs for prison facilities that are in use for 24hours in a day and 7days in a week by persons with alleged criminal attitude.

Despite several reports in print and social media on the deplorable state of Nigerian prison facilities, not much attention has been paid to them by the relevant authority. These challenges have consequences on the Nigerian Prisons Service as they put a lot of strain on budgeted maintenance costs, stretch the workforce, and affect occupants' needs/priorities in terms of health, safety, security, functional performance and satisfaction.

## **2.1 Factors affecting prison maintenance management**

Critical issues that affect maintenance management are enormous and these impacts on the overall maintenance activities of prison facilities just as in other facilities or system. The major factor influencing maintenance management is financial (Zakaria, Arifin, Ahmad and Aiyub 2012), although other factors cannot be overlooked.

**Funding:** Zakaria et al. (2012) opine that maintenance costs are necessary expense that are part of the operating budget while Murthy, Atrens and Eccleston (2002) see cost of maintenance (preventive, corrective and predictive) as a fraction of total operating budget. It is important that effects of such factors are assessed for optimum maintenance management (Oladapo 2005). Nigerian Prison Service's total annual capital expenditures between 1985 and 1988 ranged from N3 million to N11.6 million (Library of Congress Country Studies; CIA World Factbook 2005). In 2012, the total expenditure was N56.7billion. Capital expenditure was N3billion while construction of fixed assets and repairs of fixed assets was N1.5 billion and N716 million respectively ([www.budgetoffice.gov.ng](http://www.budgetoffice.gov.ng)). This shows a rise in capital expenditure and government concern for the maintenance budget.

**Deterioration due to age of buildings or facilities:** Another influential factor includes the rate at which prison facilities/systems deteriorate; facilities, plant/equipment and tools degenerate with age and use. Deterioration of facilities worsens the condition of facilities and ultimately increases cost of operation of facilities or render facilities non operational (Durango and Madanat 2002). The rate of deterioration of facilities could be attributable to decisions made during design, manufacturing and construction of the facilities, design characteristics, environmental condition, intensity of facilities usage and technical skills of operator and the maintenance officers (Durango and Madanat, 2002; Murthy, et al. 2002).

**Plant, equipment, materials and spare parts for maintenance operations:** There are factors influencing the choice of plant and equipment for maintenance operations as regard to when and where to purchase based upon data from previous machines and competing suppliers

(Sherwin 2000). In essence, the use of poor quality materials and spare parts affect the quality of maintenance, repairs and efficiency of maintenance.

Pun, et al. (2002) acknowledge that effective maintenance management is attributable to proper deployment of maintenance resources such as spare parts, maintenance materials, tools, equipment and manpower. In the same vein, Arditi and Nawakorawit (1999) affirm that the functional design of facilities and quality of materials and equipment used are of major importance to maintenance activities.

***Reckless use of facilities:*** Zubairu (1999) asserts that maintenance problems are aggravated by the uncaring attitude and concerns of users of public facilities that see the maintenance of public facilities as the sole responsibility of government. The need for repairs and maintenance often thus results from vandalism, misuse and improper handling by users' of facilities (Technical Information Document 2000)

***Third-party vandalism:*** Third-party vandalism is the crime of destroying or damaging of equipment, facilities deliberately. It is a nuisance attitude involving broken glass, graffiti, destruction of materials and damage to equipment (Farinloye, Odusami and Adewunmi 2013). Vandalism is also acknowledged as a significant factor determining the maintenance requirement of any facilities or systems (Olubodun 2001).

***Delay in reporting failures and executing repairs:*** Delay in reporting defect by the users of facilities and executing repairs is likely to cause permanent damage. Duffuaa and Al-sultan (1997) maintain that with a well developed schedule for maintenance jobs, delay in executing maintenance activities are likely to be minimised.

***Workmanship:*** There is frequently a shortage of qualified and trained technical skill and manpower requirement (Duffuaa and Al-sultan 1997) to undertake maintenance activities. This shortage of skill has a great impact on the workmanship outcome of technical skill workers in the maintenance of infrastructure and facilities (Forster and Kayan 2009). Poor workmanship is reducible by quality control and training. Provision of technical training via traditional skills education and professional training has been recognised to relieve the shortage of skills and inadequacy of professional skill for specialised maintenance activities (Forster and Kayan 2009).

***Training and development of maintenance personnel:*** Maintenance works are essentially performed by craftsmen most of whom acquire skill by 'watch and learn' and by apprenticeship training for skill development. Lack of technical skill training leads to poor quality of maintenance particularly where technical skill is required (Sherwin 2000). Training and development of employee involves acquisition of knowledge and specialized skills required to perform their duties properly. Technical skills training increase optimum performance of tasks and productivity of maintenance (Abdullah Sani, et al. 2012). Training assists in maintenance resource allocation when scheduling maintenance tasks, helps in quicker maintenance delivery and ensures safe on-site practice (CITB 2008).

***Lack of discernable maintenance culture:*** Developing countries are well known for their poor maintenance culture (Mushumbusi 1999). Lack of discernable maintenance culture in public buildings leads to environment that are not conducive for occupants, such as hospital, prison, etc. People working and interacting in public facilities are often exposed to allergic like dizziness, nausea, irritation of mucus membrane and sensitivity to odour for waste, poor toilet facilities and unkempt environment (Adenuga and Ibiyemi 2012). A study of Faremi and

Adenuga (2012) confirms lack of a discernable maintenance culture as a factor responsible for poor maintenance management of public facilities. Maintenance culture has been recognised to influence the quality of maintenance work which invariably extends the life cycle of facilities as well as health and safety of occupants (Abdullah Sani, et al. 2012).

***Maintenance work priorities:*** Policy statements are crucial to an organisation. They describe how the organisation deals with maintenance activities, with the standards to be achieved being well stated when carrying out maintenance works. This has to cover the financing and major maintenance programmes to be carried out within a given span of time. The limited resources available necessitate the drawing up of a priority list in terms of what is viewed as emergency work or what is to be phased out for future dates. This is usually prioritised based on the physical characteristics (degree of deterioration), economic value of the facilities and statutory requirements to be observed (Mushumbusi 1999).

***Lack of motivation for maintenance staff:*** Government attitude towards maintenance of its public facilities can often be disturbing. Most times owners of facilities take short-term approach to maintenance, failing to get the benefits of regular minor interventions (Forster and Kayan 2009). To correct this, it is important to have staff motivated for a maintenance regimen. Motivation is the act of encouraging a person in achieving a certain goal. This can make a work environment to be filled with passion and every maintenance staff becomes more dedicated to maintenance tasks they are assigned to do. Motivation can be created for maintenance staff through recognition, a reward system and support from management commitment towards the welfare of individual (Abdullah Sani, et al. 2012).

***Construction of facilities:*** The design and construction of facilities must be strictly monitored and should involve the technical competency of the maintenance profession. Faulty design and construction of facilities is attributable to degradation of facilities (Murthy, et al. 2002).

***Overcrowding:*** Increase in rate of growth of inmates relative to prisons' installed capacities has resulted in congestion of prisons (PRAWA 2000). Congestion of prisons has a negative impact on inmates, the prison system and maintenance of prison facilities. This could also cause premature obsolescence of the few facilities that are grossly inadequate for prison service ('Prison of Horror' 2000). This has also been identified as a significant factor that affects maintenance of prison infrastructure (Farinloye, Adenuga and Iyagba 2010).

***Inspection of facilities:*** Lee (1992) identifies planning of facilities inspection as a critical function in the maintenance of facilities. The inspection of facilities is important as this gives a clear picture of the magnitude of maintenance works to be carried out and relatively maintenance resources to be utilized.

### **3. RESEARCH METHODOLOGY**

The study was conducted in prisons in South-West, Nigeria. This consist of Lagos having five (5) prisons, Ogun having five (5) prisons, Oyo having two (2) prisons, Osun having two (2) prisons, Ondo having five (5) prisons, and Ekiti State having one (1) prison till date (PRAWA, 1999; [www.prisons.gov.ng](http://www.prisons.gov.ng)). The study population was made up of all the prison maintenance staff in the 20 prisons located across South-West, Nigeria ([www.gov.ng/prison](http://www.gov.ng/prison)).

Structured questionnaires were administered to prison maintenance staff across the South-West. The entire number of the prison maintenance staff in the unit which was relatively low, this prompted the study to adopt census sampling technique, where every member of the population was sampled (Statistic Canada, 2013). The number of prisons across Nigeria is 155 while the number in South-West, Nigeria is 20; this makes up 12.9% of the total number of Nigerian prisons (Wikipedia, 2016). This implies that the study on all prisons in South-West could be a good representation of the whole prisons across Nigeria. The census sample is an approach suitable for small population, as it eliminates error and provides data on all the individuals in the population. For this study, an accuracy of  $\pm 5\%$  was desired; hence the sample size of forty two prison maintenance staff from the twenty (20) prisons study.

#### **4. RESULTS AND DISCUSSION**

##### **Factors affecting maintenance management of prison facilities**

Table 1 shows the responses of prison maintenance staff on factors affecting maintenance management of prison facilities in prisons across states in South-west, Nigeria. To quantify the effect of factors affecting the maintenance management of prison facilities, a graduated scale of 1- 5 was used and mean score were calculated. The mean values were interpreted using the following scale  $1.00 \leq MS < 1.49$  means insignificant,  $1.50 \leq MS < 2.49$  means barely insignificant,  $2.50 \leq MS < 3.49$  means partially significant,  $3.50 \leq MS < 4.49$  means significant and  $4.50 \leq MS \leq 5.00$  means highly significant.

Prison maintenance staff in Lagos prisons indicated that effects of overcrowding and insufficient funding (4.33) ranked first was significant. It was also indicated that the effect of poor quality of materials and spare parts used for maintenance repairs (1.50) ranked sixteenth was barely insignificant. In Ogun prisons, prison maintenance staff indicated that effect of overcrowding and insufficient funding (3.75) ranked first were significant while the effect of reckless use of facilities (1.25) ranked sixteenth was insignificant.

Prison maintenance staff in Oyo prisons considered the effects of natural deterioration of facilities due to age (4.00) ranked first and third-party vandalism (3.80) ranked second to be significant. Also, barely insignificant factors were maintenance works not based on priorities and delay in reporting failures (2.00) ranked tenth, insufficient funding and poor quality of materials and spare parts used for maintenance repairs and irregular inspections (1.80) ranked thirteenth and poor workmanship (1.75) ranked sixteenth.

Table 1: Factors affecting Maintenance Management of Prison Facilities in South-West, Nigeria.

Factors	N	Lagos Prisons		Ogun Prisons		Oyo Prisons		Ondo Prisons		Ekiti Prison		Pooled Mean Score	Overall ranking
		MS	R	MS	R	MS	R	MS	R	MS	R		
Natural deterioration due to age of facilities.	20	4.00	3	3.50	3	4.00	1	4.57	1	3.67	4	4.05	1
Overcrowding	21	4.33	1	3.75	1	2.33	8	4.25	2	4.00	2	3.86	2
Inadequate training & development for maintenance staff	22	3.67	6	3.00	6	2.25	9	3.00	5	4.33	1	3.14	3
Insufficient funding	23	4.33	1	3.75	1	1.80	13	3.38	4	1.67	14	3.00	4
Lack of discernible maintenance culture	21	3.50	8	2.75	10	2.50	5	3.50	3	2.33	10	3.00	4
Inadequate plant & equipment for maintenance operations	22	3.67	6	3.00	6	2.75	4	2.63	6	3.67	4	2.91	6
Lack of motivation for maintenance staff	23	4.00	3	2.50	11	2.80	3	2.63	6	3.00	6	2.87	7
Third-party vandalism	23	2.67	13	2.50	11	3.80	2	1.87	9	1.33	15	2.43	8
Irregular inspections	23	2.67	13	3.00	6	1.80	13	1.63	10	4.00	2	2.35	9
Delay in executing repairs	22	4.00	3	2.50	11	2.00	10	1.38	12	3.00	6	2.27	10
Poor construction of facilities	23	2.67	13	3.50	3	2.40	6	1.13	15	2.67	9	2.22	11
Maintenance work not based on priorities	22	3.00	10	2.50	11	2.00	10	2.25	8	1.33	15	2.22	11
Poor workmanship	22	3.00	10	3.00	6	1.75	16	1.50	11	2.33	10	2.14	13
Poor quality of materials & spare parts used for repairs	21	1.50	16	3.33	5	1.80	13	1.38	12	2.33	10	1.90	14
Reckless use of facilities.	23	3.33	9	1.25	16	2.40	6	1.13	15	2.33	10	1.87	15
Delay in reporting failures	23	3.00	10	2.50	11	2.00	10	1.38	12	3.00	6	1.83	16
<b>Grand</b>		<b>3.37</b>		<b>2.86</b>		<b>2.38</b>		<b>2.31</b>		<b>2.69</b>		<b>2.61</b>	

\*MS=mean score, R=ranking, N=number of respondents

Coding: HS = highly significant, 5; S = significant, 4; PS = partially significant, 3; BIS = barely insignificant, 2; IS = insignificant, 1. Interpreting scale:  $1.00 \leq MS < 1.49$  means insignificant effect,  $1.50 \leq MS < 2.49$  barely insignificant effect,  $2.50 \leq MS < 3.49$  means partially significant effect,  $3.50 \leq MS < 4.49$  means significant effect and  $4.50 \leq MS \leq 5.0$  means highly significant effect.

In Ondo prisons the effect of deterioration due to age of facilities (4.57) ranked first was highly significant while the effects of overcrowding (4.25) ranked second and lack of a discernible maintenance culture (3.50) ranked third were significant. Ondo prison maintenance staff also indicated that effects poor construction of facilities and reckless use of facilities (1.13) ranked fifth were insignificant. In the Ekiti prison, maintenance staff indicated that the effects of inadequate training and development for maintenance staff (4.33) ranked first was significant. Also, the effects of maintenance works not based on priorities and third-party vandalism (1.33) ranked fifteenth were insignificant.

Overall, prison maintenance staff indicated that the effects of natural deterioration due to age of facilities (4.05) and overcrowding (3.86) were significant. It was indicated that poor quality of materials and spare parts used in repairs (1.90), reckless use of facilities (1.87), and delay in reporting failures (1.83) were barely insignificant. The study revealed the predominance of diverse factors affecting the maintenance management of prison facilities in each of the prison locations across South-west, Nigeria. This implies that the factors like natural deterioration due to age of facilities, overcrowding, and inadequate training and development of maintenance staff among other factors strongly affect maintenance management of prison facilities.

## Hypothesis

**Null hypothesis:** There is no agreement in ranking of factors affecting maintenance management of prison facilities in south-west.

**Alternative hypothesis:** There is an agreement in ranking of factors affecting maintenance management of prison facilities in south-west.

*Table 2: Kendall's coefficient of concordance test of agreement on ranking of factors affecting maintenance management of prison facilities*

No of cases	Kendall's W	Chi-square	Df	P-value
16	0.271	78.126	18	0.001

Kendall's coefficient of concordance test was further used to test for agreement among the respondents in their ranking of the sixteen factors. Test indicates a significant agreement among the respondents at  $p < 0.05$ .

This result is consistent with Oladapo (2005), where age of buildings and overcrowding are identified as important determinant factors in housing maintenance. The study is also in line to Farinloye et al. (2010) study on the significance of factors affecting maintenance of which deterioration of facilities due to age and staff training was rated significant. These findings suggest that the Nigerian Prisons Service should consider these underlying critical factors when making relevant decisions on maintenance works.

Predominant factors that affecting maintenance management of prison facilities in South-West, Nigeria were established. The critical underlying factors are deterioration due to age of facilities, overcrowding as well as inadequate training and development for prison maintenance staff. Also, study established factors affecting maintenance management of prison facilities in each of the prison locations.

## 5. CONCLUSION AND RECOMMENDATIONS

The study acknowledged the prevalence of barriers to implementation of satisfactory maintenance management. Some of the predominant factors that affect maintenance management of prison facilities include age of building, overcrowding and inadequate staff training and development. This gives an insight to issues militating against maintenance of prison facilities; these issues require immediate attention of the relevant stakeholders.

Prison maintenance staff should have access to prompt maintenance training and development to enhance their performance in maintenance services delivery. Continuous training provides them with the appropriate skills, attitude and degree of sensitivity required for dealing with the maintenance management of prison facilities. Government interest in the Prisons Service should encompass both the social welfare of prisons and the technical efforts aimed at redressing the deplorable state of prison facilities. The government should provide all the necessary maintenance and capital resources. Such as sufficient maintenance budgets, plant and equipment for maintenance operations and enabling policies that would ensure functionality of prison facilities. Congestion of prison facilities should be reduced or, if possible eliminated by ensuring that the judicial arm of government addresses all awaiting trial cases on time. All existing prison facilities should be promptly and adequately maintained. New prison buildings should be constructed and provided with adequate facilities provided to ease congestion.

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