

Investigation of infrastructural Maintenance in Public Institutions in Nigeria

Chigozie Okafor¹ & Clinton Aigbavboa¹

SARChI in Sustainable Construction Management and Leadership in the Built Environment,
Faculty of Engineering and the Built Environment, University of Johannesburg.
Corresponding – author – chigozie.okafor@unn.edu.ng

Abstract. Maintenance is the act of protecting an infrastructure from decay or dilapidation so that it will continue to remain new, retain its economic importance and durability which will make the infrastructure more sustainable. When an infrastructure is sustainable it benefits and serves the present generation without denying the future generation its own benefits. This study was conducted between 2016 and 2018 to investigate the level of infrastructural maintenance in public institutions in Nigeria using the University of Nigeria, Nsukka campus as a case study. From the field investigation conducted during this study, it was observed that the University rely more on corrective maintenance which involves conducting maintenance when the infrastructure is already damaged rather than implementing preventive maintenance which involves conducting maintenance to prevent unseen damages which may occur. It was also observed from the field investigation that one of the major problems of maintenance in government owned institutions is lack funding for infrastructural maintenance. In this study it was observed that offices and classrooms in the 10 faculties housed by the University of Nigeria, Nsukka campus needed over 40% maintenance work on their walls, floor, roof, paint, window, toilet, electrical installations and doors. The faculty of Pharmaceutical science had the most maintenance problem in both the offices and classrooms. It was recommended that a holistic maintenance model should be followed in line with international best practices in advanced countries. The University should develop and follow a preventive maintenance policy by employing the services of a good maintenance/management firm to maintain and manage the University infrastructures while the works services department serves a supervisory body. In line with the trending 4th industrial revolution, it is recommended that the University should introduce the use of one stop shop maintenance services using information and communication technology (ICT). Special soft wares should be developed which can be used to keep records of building projects starting from the design, As built, till the end of the project, this can help to identify maintenance problems easily.

Keywords: Maintenance, Infrastructure, Institutions, Public, Investigation

38 **1 Introduction**

39 Maintenance of infrastructure is the act of preserving an infrastructure so that it will
40 remain sustainable by retaining its initial outlook, durability and economic importance
41 which will benefit the present and future generation. According to (cobbinah , 2006) ,
42 maintenance is simply the principle plans taken to preserve infrastructures like
43 buildings, road etc , so they can retain their initial functional state , structural and
44 aesthetic states and their investment value over a lasting period of existence.
45 Maintenance plan is a very important part of infrastructural design which is neglected
46 in Nigeria unlike in most developed Countries where infrastructures are designed
47 alongside its maintenance plan.

48 In most Nigerian government owned institutions, lack of maintenance of
49 infrastructure has been a major problem, most buildings and roads within the premises
50 of the institutions are allowed to dilapidate to a large extent before any maintenance
51 plan is made for it. This leads to serious economic loss because more money is spent
52 to rebuild the entire dilapidated infrastructure than it would have cost if a proper
53 preventive maintenance plan was followed. Most public institutions in Nigeria rely
54 heavily corrective maintenance which involves carrying out maintenance after some
55 damages most have occurred. Maintenance problems have remained largely unsolved
56 but it can be tackled by professionals at the project inception and planning,
57 construction to completion stages via preventive rather than corrective method
58 (Ademiji, 1998).

59 It is interesting to note that in various institutions of learning, the state of the
60 infrastructures especially the buildings have a direct impact on both students and
61 lectures productivity (Lavy and Bilbo 2009).

62 This study investigated the infrastructural maintenance in public institutions using
63 the University of Nigeria, Nsukka campus as a case study.

64 At the end , proper maintenance recommendations were made, and when
65 implemented will help public institutions tackle the problems of infrastructural
66 maintenance.

67

68 **2 Aim & Objectives**

69 To investigate the infrastructural maintenance in public institutions in Nigeria and
70 make recommendations for proper maintenance of infrastructure in public institutions
71 in Nigeria.

72

73 **3 Research Methodology**

74 This study was carried out between 2016 and 2018 on various faculties in the
75 University of Nigeria, Nsukka campus to investigate the current state of

76 infrastructures within the University. As at the time of this study (2016 – 2018) , the
 77 University of Nigeria, Nsukka campus housed 10 faculties. This study was carried out
 78 by means of questionnaire survey which is a systematic mode of data collection from
 79 a target population. The target population in this study were staff who occupy offices
 80 in these various faculties (non-teaching staff and teaching staff) and students who
 81 use classrooms in these faculties. Five hundred questionnaires were distributed
 82 amongst staff and students and 378 were returned this represents a 75.6% response
 83 rate. Improper or half-filled questionnaires were returned back to the respondent on
 84 the point of collection to complete them.

85 The questionnaire used for this survey was categorized into condition of building
 86 by parts. Condition of building by parts can be defined as a building maintenance
 87 analytical approach which breaks down a building into several parts for easy
 88 assessment.

89 For the purpose of this study, this conditions of buildings were analyzed under
 90 eight different parts which includes: i. Condition of the floor, ii. Condition of the roof,
 91 iii. Condition of the wall, iv. Condition of the paint, v. Condition of the window,
 92 vi. Condition of the toilet, vii. Condition of electrical installations, viii. Condition
 93 of the doors

94 Results

95 **Table 1.** Represents the general statistical condition of faculty offices in the
 96 University of Nigeria, Nsukka campus

Element	Leak	Rusty	Partly R/off	Cracks developed	Peeled off	Partially Broken down	Comp. Broken Down	In good C/dtion	Maint. Work needed
Roof	32.8%	12.6%	8.9%					45.5%	55.3%
Floors				13.8%	22.3%			63.7%	36.1%
Walls				27.8%	10.8%	6.3%		55.1%	44.9%
Window						39.1%	5.1%	55.8%	44.2%
Doors						28.7%	2.4%	69.1%	31.1%
Toilets	4.2%					39.1%	19.8%	36.7%	63.1%
Electric facilities						47.2%	5.8%	46.8%	63%

Paint	No	Worn out	Dirty	45.1%	54.9%
	Paint	Paint	11.9%		
	2.9%	40.1%			

97

98

Note: The table titles are ; Elements, leaking, Rusty, Partly ripped off, Cracks developed, Peeled off, Partially broken down, Completely broken down, In good condition, Maintenance work needed.

99

100

101

102

103

104

Table 2. Represents the general statistical condition of faculty classrooms in the University of Nigeria, Nsukka campus

Elements	Leak	Rusty	Partly R/off	Cracks developed	Peeled Off	Partially Broken Down	Comp. Broken Down	In good C/dition	Maint. Work Needed
Roof	18.8%	18.2%	16.5%					46.5%	53.5%
Floors				22.9%	13.6%			63.5%	36.5%
Walls				8.8%	7.3%	9.2%	8.3%	66.4%	33.6%
Windows						36.7%	8.2%	54.8%	44.9%
Doors						25%	5.1%	69.7%	30.1%
Toilets	2.3%					17.7%	32.1%	47.7%	52.1%
Sewage System	5.7%					18%	17.9%	58.2%	41.6%
Electrical facilities						50.8%	11.6%	37.3%	62.4%
Paint	No	Worn out	Dirty					53.2%	46.5%
	Painting	Paint	9.7%						
	3.9%	32.9%							

105

106

107

Note: The table titles are ; Elements, leaking, Rusty, Partly ripped off, Cracks developed, Peeled off, Partially broken down, Completely broken down, In good condition, Maintenance work needed.

108 4 Discussion

109 **3.1** The write up below discusses the general statistical condition of faculty offices in
110 the University of Nigeria, Nsukka campus which is represented in table 1.

111 (i) Roof: 32.8% of the offices in different faculties have leaking roof, 12.6%
112 have rusty roof , 8.9% have partly ripped off roof. Only 45.5% of the offices still have
113 their roofs in good condition. This means that 55.3% of the offices need to have their
114 roofs maintained urgently.

115 (ii) Floor: 13.8% of the offices in different faculties have cracked floor, 22.3%
116 have peeled off floor while 63.7% still have their floor in good condition. This means
117 that 36.1% of the offices need to have their floor maintained.

118
119 (iii) Wall: 6.3% of the offices in different faculties have partially broken down
120 walls, 27.8% have cracked walls, 10.8% have peeled off walls and 55.1% are in good
121 condition. This means that 55.1% of the offices have their walls in good condition
122 while 44.9% of the offices needs to have their walls urgently maintained.

123
124 (iv) Paint: 2.9% of the offices in different faculties have no painting, 40% have
125 worn out painting, 11.9% have dirty painting ,and only 45.1% have their painting still
126 in good condition. This means that 54.9% of the offices in the University need re-
127 painting.

128
129 (v). Windows: According to the survey conducted 5.1% of the offices in
130 different faculties within the University have completely broken windows, 39.1%
131 have partially brown down windows while 55.8% have their windows still in good
132 condition. This means that 44.2% of the offices have bad windows and are in need of
133 maintenance.

134 (vi) Doors: 2.4% of the offices in different faculties within the University have
135 their doors completely broken down, 28.7% have partially broken down doors while
136 69.1% are in good condition. With 69.1% of the offices having their doors in good
137 condition this means that the University has little problem as regards maintenance of
138 doors and this is because occupants repair their doors when broken, however 31.1%
139 of the offices need to have their doors maintained.

140
141 (vii) Electrical Installations: 47.2% of the offices in different faculties have
142 partially functioning electrical installations, 5.8% have completely broken down
143 electrical installations while only 46.8% of the offices have their electrical
144 installations still in good condition. This means that 53% of the offices have their
145 electrical installations in bad condition and needs urgent maintenance.

146
147 (viii) Toilets: 4.2% of the offices in different faculties in the University have
148 leaking toilet facilities, 39.1% have partially broken down toilet facilities, 19.8% have
149 completely broken down toilet facilities while only 36.7% of the offices still have

150 their toilet facilities in good condition. This means that 63.1% of the offices need to
151 have their toilet facilities urgently maintained.

152

153

154

155

156

157 **3.2** The write up below discusses the general statistical condition of faculty
158 classrooms in the University of Nigeria, Nsukka campus which is represented in
159 table2.

160

161 Roof: 18.8% of the classrooms have leaking roof, 18.2% have rusty roof, 16.5% have
162 partly ripped off roof. Only 46.5% of the classrooms still have their roofs in good
163 condition. This means that 53.5% of the classrooms need to have their roofs
164 maintained urgently.

165 (ii) Floor: 22.9% of the classrooms have cracked floor, 13.6% have peeled off floor
166 while 63.5% still have their floor in good condition. This means that 36.5% of the
167 classrooms need to have their floor maintained.

168

169 (iii) Wall: 9.2% of the classrooms have partially broken down walls, 8.8% have
170 cracked walls, 7.3% have peeled off walls, 8.3% have bent walls and 66.4% are in
171 good condition. This means that 66.4% of the classrooms have their walls in good
172 condition while 33.6% of the classrooms needs to have their walls urgently
173 maintained.

174

175 (iv) Paint: 3.9% of the classrooms have no painting, 32.9% have worn out painting,
176 9.7% have dirty painting, and only 53.2% have their painting still in good condition.
177 This means that 46.5% of the classrooms in the University need re-painting.

178

179 (v) Windows: According to the survey conducted 8.2% of the classrooms in the
180 University have completely broken windows, 36.7% have partially brown down
181 windows while 54.8% have their windows still in good condition. This means that
182 44.9% of the classrooms have bad windows and are in need of maintenance.

183

184 (vi) Doors: 5.1% of the classrooms in the University have their doors completely
185 broken down, 25% have partially broken down doors while 69.7% are in good
186 condition. With 69.7% of the classrooms having their doors in good condition this
187 means that the University has little problem as regards to maintenance of doors,
188 however 30.1% of the classrooms need to have their doors maintained.

189

190 (vii) Electrical Installations: 50.8% of the classrooms have partially functioning
191 electrical installations, 11.6% have completely broken down electrical installations
192 while only 37.3% of the classrooms have their electrical installations still in good

193 condition. This means that 62.4% of the classrooms have their electrical installations
194 in bad condition and needs urgent maintenance.

195

196 (viii) Toilets: 2.3% of the classrooms in the University have leaking toilet facilities,
197 17.7% have partially broken down toilet facilities, 32.1% have completely broken
198 down toilet facilities while only 47.7% of the classrooms still have their toilet
199 facilities in good condition. This means that 52.1% of the classrooms need to have
200 their toilet facilities urgently maintained.

201

202 **5 Conclusions and Recommendations**

203 This study has shown that infrastructural maintenance is a big problem in most
204 government owned public institutions in Nigeria. Most of these institutions rely on
205 corrective maintenance which in most cases isn't the best form of maintenance
206 practice, the best infrastructural maintenance practice remains the preventive
207 maintenance which involves carrying out maintenance practices to prevent unseen
208 future maintenance problems which might occur. Due inadequate funding of public
209 institutions by the government , maintenance of infrastructure remains a big a
210 problem because funds are not budgeted for maintenance. Due to lack of proper
211 maintenance, the buildings within the University are fast losing its durability ,
212 economic value and are not sustainable, in other to fix these buildings it will cost the
213 University a huge sum of money than it would have cost if a proper maintenance plan/
214 schedule had been adopted. From the results above, it is observed that the faculty
215 buildings, offices and classrooms within the University of Nigeria, Nsukka campus
216 needed above 40% maintenance work which implies that most of them are dire need
217 of maintenance work.

218 Therefore it is recommended that:

219 • A holistic maintenance model should be followed in line with international
220 best practices in advanced countries.

221 • The University should develop and follow a preventive maintenance policy
222 by employing the services of a good maintenance/management company to maintain
223 and manage the University infrastructure while the works services department serves
224 a supervisory body.

225 • In line with the trending 4th industrial revolution, it is recommended that the
226 University should introduce the use of one stop shop maintenance services using
227 information and communication technology (ICT).

228 • Special soft wares should be developed which can be used to keep records of
229 building projects starting from the design, As built, till the end of the project, this can
230 help to identify maintenance problems easily.

231 The above recommendations if implemented will reduce maintenance problems
232 faced by the University.

233

234

235
236
237
238
239

240 **References (Times New Roman 12)**

- 241 1. Cobbinah, P. J. (2010). Maintenance of Buildings of Public Institutions in Ghana, Case
242 Study of Selected Institutions in the Ashanti Region of Ghana. M.Sc. Thesis, Kwame
243 Nkrumah University of Science and Technology, Kumasi, Ghana.
- 244 2. Adejimi, A. (1998). Optimizing Management of Design Process for Effective Maintenance
245 of Public Buildings in Lagos state. Msc Thesis, Department of building, University of
246 Lagos.
- 247 3. Sarel, L , Bilbo, D.L. (2009). Facilities Maintenance Management Practices in Large
248 Public schools, Texas.
- 249
250
251