

Maintenance of the Federal Secretariat Complex Minna, Niger State: A Post Occupancy Evaluation Approach

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ABSTRACT

Government office buildings in Nigeria are generally faced with premature but steady and rapid deterioration, decay and dilapidation due to lack of maintenance. This study evaluates the main factors responsible for the poor maintenance of the Federal Secretariat Office Complex, Minna, Nigeria using a post-occupancy evaluation approach. The study determines the extent of dilapidation of the office building and the feelings of the users about their office environment. The most frequently recurring maintenance problems are ascertained. By using occupants as a benchmark in evaluation, this paper discusses research with the broad aim of developing a general guideline for the POE practice, specifically for government and public buildings in Nigeria. The research method used was a combination of the descriptive and analytical survey methods. A total of 20 structured questionnaires comprising were administered to the users of the office building. The data collected were analyzed using descriptive and inferential statistics. Some of the findings of the study are that the major contributors to the maintenance problems in government office buildings in Nigeria are natural deterioration due to age, environmental effects and misuse by occupants. Funding for maintenance was found to be grossly inadequate. The most frequently recurring maintenance problems in the office buildings are plumbing and roof leakages. Post-occupancy evaluation (POE) of buildings is vitally needed to ensure that building performance of government and public buildings and facilities is sustained. The study recommends POE as an effective, relevant and beneficial tool to be used by the public sector in evaluating the performance of government and public buildings in Nigeria.

Keywords: *Government Office Building, Post Occupancy Evaluation, Maintenance,*

INTRODUCTION

Evaluation and assessment of one's performance over a period of time is important in all spheres of life as this fosters improvement in future endeavours (Zubairu, 1999). In the sphere of buildings however, construction professionals such as architects and engineers rarely carry out evaluation of completed buildings or even receive useful feedback about the performance of completed building projects. This is to ensure that the building efficiently fulfils the purpose for which it was designed at every given point in time particularly ensuring the users' or occupant's satisfaction. The maintenance aspect of buildings on the other hand, is carried out over a period of time after a building has been occupied in order to sustain and preserve its functionality. The British Standard Institution (3811, 1976) defines maintenance as the work undertaken in order to keep, restore or improve every facility, i.e. every part of a building, its services and surrounds, to an accepted standard and to sustain the utility and value of the facility. Zubairu (1999) reiterates that the whole essence of carrying out maintenance on buildings is to ensure that the building is in a safe and healthy condition in accordance with specified standards for the users or occupants.

The focus of this research is to determine the main factors responsible for the poor maintenance of the Federal Secretariat Complex, Minna, Nigeria using a Post-occupancy evaluation (POE) approach. Post-occupancy evaluation is a systematic manner of evaluating buildings after they have been built and occupied for durations of time (Preiser, 1995, 2002). It is the evaluation of the performance of buildings after occupancy. According to Vischer (2002), POE is not limited to determining clients' or users' satisfaction, but can also be harnessed to fulfill other objectives, such as determining building defects, supporting design and construction criteria, supporting performance measures for asset and facility management, lowering facility lifecycle costs by identifying design errors that could lead to increased maintenance and operating costs, clarifying design objectives and improving building performance. An evaluation is carried out on the office environment of the Federal Secretariat Complex Minna to ascertain the extent of dilapidation of the office building and the feelings of the users about their office environment. One of the ways of carrying out Effective Maintenance and evaluation of a building is to understand the interaction between the needs of the users of the building and the building itself. This can be best executed through the Post-occupancy evaluation approach (POE).

In Nigeria presently, most Government and public buildings owned and controlled by the government, are in a sta

te of premature but steady and rapid deterioration, decay and dilapidation due to poor maintenance. This is typical of the Federal Secretariat Complex Minna Nigeria. Generally, Federal Secretariat Complexes in Nigeria are particularly made up of Federal ministries, agencies, and parastatals, forming the largest staff base of the civil service sector in the Country (Author’ research 2012). The Federal Secretariat Complex Minna, was constructed in 1989, and houses about thirty (30) Ministries, Departments and Agencies. An on-the- spot assessment of the building revealed multiple building defects and complex maintenance problems. According to Preiser, (2001) Federal Government buildings are responsible for ensuring that buildings are safe, secure, sustainable, accessible, cost effective to operate and maintain, motivate and engender service delivery for its workforce. This attributes aforementioned is far from being obtainable in the Federal secretariat Complexes and Government office buildings across the country. The Main purpose of this research is to propose Post-occupancy evaluation approach as an effective tool for the management and maintenance of Government Office Buildings in Nigeria.

PROBLEM STATEMENT

Despite the fact that the Federal government is the largest owner of public buildings and facilities in Nigeria, it is unfortunate that the Government is yet to realize the importance of management and maintenance of this public buildings and facilities. Our lack of maintenance culture, as a nation is particularly evident on many of our buildings in the urban centers. Government office buildings such as the Federal Secretariat are office complexes comprising of a minimum of about thirty (30) ministries, agencies and parastatals which usually have a large inventory of facilities and services due to the large number of workers and calls for a highly organized maintenance management. This however is far from being achieved. Major contributors to the maintenance problems in government office buildings in Nigeria are natural deterioration due to age, environmental effects and misuse by occupants. Funding for maintenance is found to be grossly inadequate. This situation is typical of the Federal Secretariat Complex, Minna as is obtainable in most Government office buildings in Nigeria. Generally, the Maintenance departments actually have no framework in place for assessing or evaluating the performance of the building and the satisfaction of the users, thus creating a huge backlog of maintenance issues overtime.

POST-OCCUPANCY EVALUATION

POE as defined by Watson (2003) is a systematic evaluation of opinion about buildings in use, from the perspective of the people who use them. POEs are generally aimed at conveying the parameters of buildings that work well and also at focusing on the ones that should not be repeated in future building designs. POE describes rather than manipulates settings of building performance. The data collection of POE is usually done in actual settings rather than in laboratories. Based on the relevant parameters, POE can be categorized by its purpose to serve at various stages of a building’s lifecycle. A POE study conducted by Watson (2003) at Marlborough School Technology Centre New Zealand found that the centre successfully supports student learning and produced key recommendations for the future.

Post-Occupancy Evaluation Framework The frameworks below show where POE fits in the context of an overall building performance evaluation (Figure 1), and three levels within a POE framework.

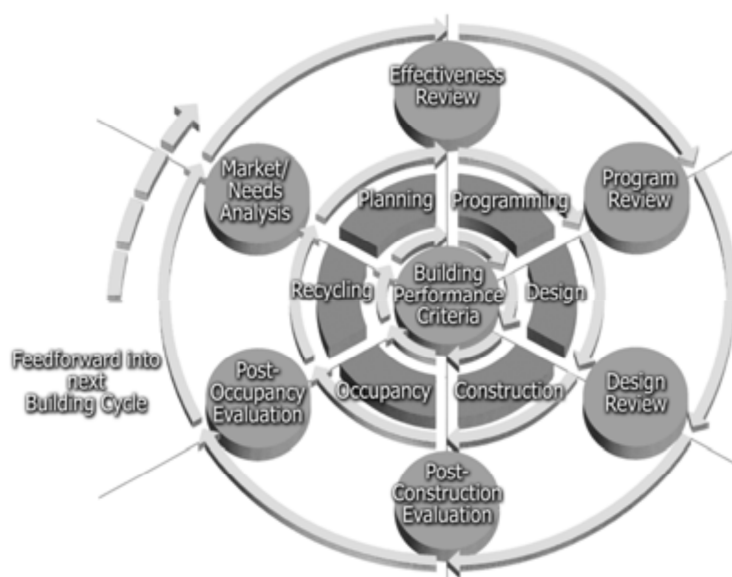


Figure 2: Building Performance Evaluation Model, Preiser, (2002) University of Cincinnati

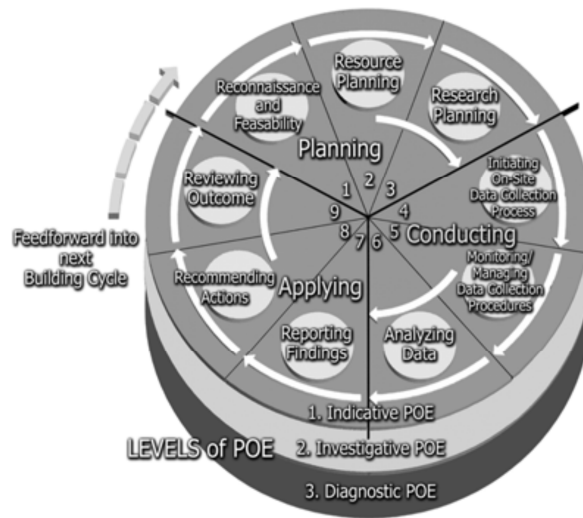


Figure 3: Post-occupancy Evaluation Framework, (Preiser 2002)

Objectives of POE

One of the primary objectives of POE is to feed forward ‘lessons learned’ from the review of completed capital projects into a process that would ensure that best practices are applied in future projects. According to Zimmerman and Martin (2001), more specifically POE tests generic and specific aspects of the planning and detailed design of facility buildings. It also tests their impact on building users with respect to several parameters such as: health and safety, security, indoor environment quality and functions.

POE as a Facility Management Tool

Figure 4 illustrates that “facility managers may become the keepers of expertise and databases/information systems on facility performance of common facility types, as opposed to architects, or independent clearing-houses. Being on-site and familiar with everyday problems and issues of building performance, facility managers may also be aided by so-called building user manuals which should be developed for facilities independently of who happens to operate them at a given point in time” (Preiser, 1995)

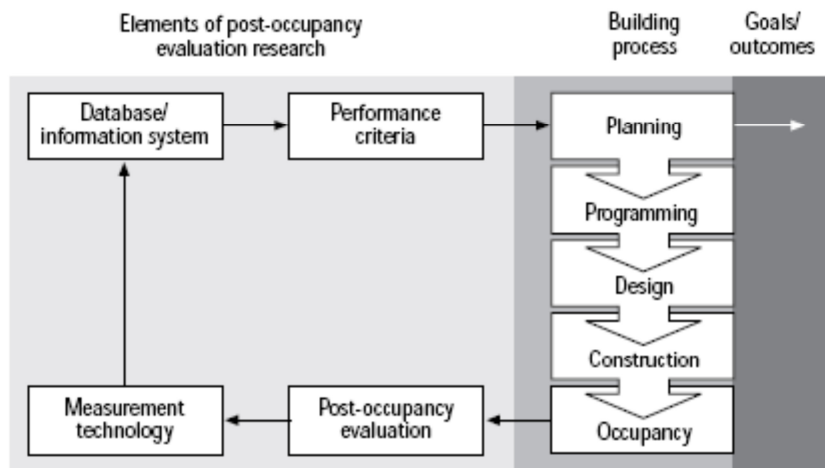


Figure 4: POE as a Facility Management Tool (Preiser, 1995)

Types of POEs

POE may be classified in three levels including: Indicative (wide ranging application), Investigative (more detailed approach), Diagnostic (extremely detailed and focused study). Vischer, (2001) identifies four separate types of POE and illustrates each with a case study. These are Building-behavior research or the accumulation of knowledge,

Information for pre-design programming for buildings for which design guides or prototypes may be useful, Strategic space planning – e. building assessment as part of ‘workspace change to bring space use more in line with strategic business goals and, Capital asset management where POE is considered a tool in developing performance measures for built space. In 1995, taking into consideration the various methods of conducting POE, Preiser (1995) developed a process model as shown below in figure 5. The model represents the three phases and nine steps of his POE process.

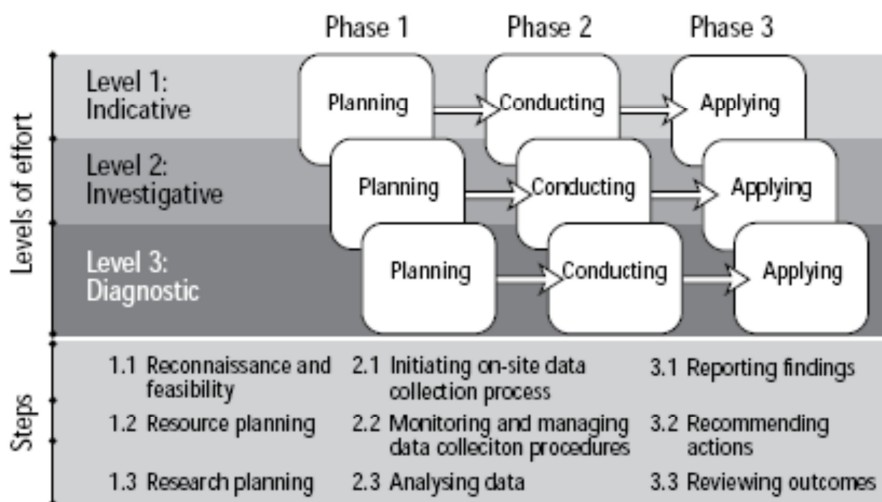


Figure 5: Post-occupancy Evaluation Process Model (Preiser, 1995)

RESEARCH METHODOLOGY

This research according to Preiser, (2002), is an indicative Post –Occupancy Evaluation (POE) using specific criteria. This research adopts the approach utilized by Nawawi (2008). The first section consists of comparative analyses of building performance reviews, with the aim of determining the score performance under poor, medium or good performance. The second section features the presentation of results and analysis of the survey findings regarding the satisfaction level of the surveyed building occupants in terms of building elements, services and environment. The survey findings were obtained from structured questionnaires administered to 20 occupants of the building.

The questionnaires were administered to the users/ staffs of the of the Federal Secretariat, Minna, to obtain specific data for the study and to provide recommendations. The quantitative data were analyzed using descriptive and inferential statistics. The process of evaluation was adapted from Voordt and Wegen, (2005) which necessarily involves determining the factors to be assessed (from literature and related studies). The actual evaluation was carried out through researcher observation and photographic records, and defects noted.

RESEACH FINDINGS AND DISCUSSIONS

Building performance Measurement of the Federal Secretariat Complex, Minna

The building performance of the Federal Secretariat Complex was measured based on the POE guideline by using a score based on the quality of various building elements, services and environment. This measurement means that the building elements, services and environment of the building are rated into a scale of 10, which represents a full rating (R = 1.0). Thus, the building performance score is rated as follows:

Excellent if rating is =1.0($R= 1.0$) **Poor** if the rating category is below 4 ($R < 0.4$), **Medium** if the rating category is 5 ($R = 0.5$) **Good** if the rating category is above 6 ($0.6 > R < 0.9$). Table 1 below presents the summary of results of the building performance rating, based on the 18 parameters of building elements, services and environment. This rating is compared side by side with the building occupants’ satisfaction rating, as they serve as the benchmark for evaluation since are the direct users/occupants of the building and are able to indicate the building problems.

User’s satisfaction rating of building elements, services and environment of the Federal Secreteriat, Complex, Minna

The questionnaire in Appendix B was designed to determine the satisfaction level of the building occupants on the



18 parameters, based on a Likert scale. ‘Dissatisfied’ if $0.10 < SR < 0.49$ ‘Neutral’ if $0.50 < SR < 0.59$ ‘Satisfied’ if $0.60 < SR < 1.0$. The calculation of the scores for occupants’ satisfaction is based on the 18 parameters listed in the questionnaire. The Building Performance Rating score needs to be compared with the building occupants’ satisfaction score, as they had sufficient time to experience the performance of the buildings, and hence were able to identify any chronic problems.

TABLE 1: BUILDING PERFORMANCE RATING OF BUILDING ELEMENTS, SERVICES AND ENVIRONMENT OF THE FEDERAL SECRETARIAT, MINNA.

‘Poor’ if $0.10 < PR < 0.40$, ‘Medium’ if $PR = 0.50$, ‘Good’ if $0.60 < PR < 0.9$ ‘Excellent’ if $PR = 1.0$

S/No.		PERFORMANCE RATING
1	Floor finishes	0.5
2	Wall finishes	0.4
3	Ceiling finishes	0.4
4	Doors	0.5
5	Windows	0.4
6	Staircase	0.6
7	Roof	0.3
8	Quality of finishes	0.4
9	Structural stability	0.5
10	Maintenance	0.4
11	Degree of cleanliness	0.4
12	Quality of lighting	0.5
13	Ventilating systems	0.4
14	Landscaping and Environmental quality	0.4
15	Noise Pollution and Vibration	0.6
16	Electrical/ Mechanical services	0.5
17	Water and plumbing services	0.5
18	External Visual Quality	0.3

Source: Author’s Field Studies 2012

The results from Table 1 above show that the performance of the Federal Secretariat Complex is averagely rated as poor (with $PR = 0.4$). With exception of the Staircase as the only building element rated as “Good, this evaluation was, conducted based on a one-time study visit and observation. Due to natural deterioration due to age, environmental effects and misuse by occupants and lack of a planned maintenance programme it is quite evident that overtime a backlog of maintenance works is conspicuously evident and prevalent on every building element, services and environment. This hence calls for urgent attention and action by the maintenance departments of the building and the Federal Government.

TABLE 2: USER'S SATISFACTION RATING OF BUILDING ELEMENTS, SERVICES AND ENVIRONMENT OF THE FEDERAL SECRETARIAT, MINNA.

'Dissatisfied' if $0.10 < SR < 0.49$ 'Neutral' if $0.50 < SR < 0.59$ 'Satisfied' if $0.60 < SR < 1.0$

S/No.	BUILDING ELEMENTS, SERVICES AND ENVIRONMENT	USERS SATISFACTION RATING
1	Satisfaction with Floor finishes(aesthetics & durability)	0.49
2	Satisfaction with Wall finishes (aesthetics & durability)	0.49
3	Satisfaction with Ceiling finishes(aesthetics & durability)	0.49
4	Satisfaction with Doors (aesthetics & durability)	0.49
5	Satisfaction with Windows (aesthetics & durability)	0.49
6	Satisfaction with Staircase (aesthetics & durability)	0.6
7	Satisfaction with Roof finish, quality and stability	0.49
8	Satisfaction with Quality of finishes	0.49
9	Satisfaction with Structural stability	0.49
10	Satisfaction with Maintenance	0.49
11	Satisfaction with Degree of cleanliness	0.49
12	Satisfaction with Quality of lighting	0.6
13	Satisfaction with Ventilating systems	0.6
14	Satisfaction with Landscaping and Environmental quality	0.49
15	Satisfaction with Noise Pollution and Vibration	0.6
16	Satisfaction with Electrical/ Mechanical services	0.49
17	Satisfaction with Water and plumbing services	0.49
18	Satisfaction with External Visual Quality	0.49

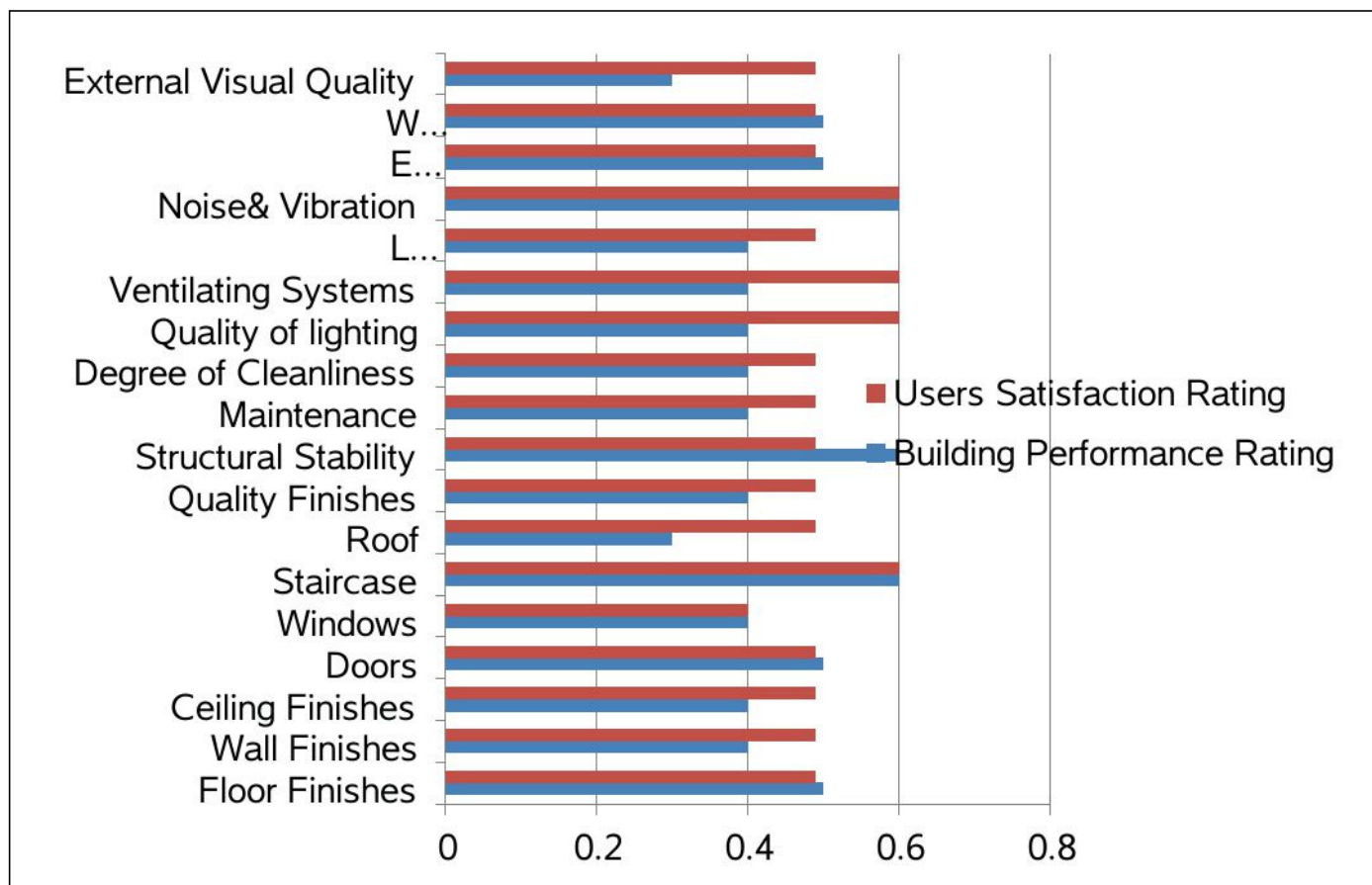
Source: Author's Field Studies 2012

The results from Table 2 above show that the building users' satisfaction rating of the Federal Secretariat complex building elements, services and environment is averagely rated as poor (with $SR = 0.4$). The rating of the staircase, Lighting quality and Ventilating systems ($SR = 0.4$) are the only building elements the user's/staffs are satisfied with.

SUMMARY OF FINDINGS

Summarily, the results from table 1 and 2 above indicate that there is a strong relationship between the Performance of the building elements, services and environment Federal Secretariat Complex Minna and the satisfaction of the user's/occupants of the Building. Both ratings on all the 18 parameters outlined measured averagely on the same score with exception of the Staircase, lighting quality and ventilating systems as the only building elements rated as satisfactory on the scale of the user's/occupants. All the parameters were rated as poor in all ramifications and users were unsatisfied with their performance. This is evident as stated earlier that due to natural deterioration due to age, environmental effects and misuse by occupants and lack of a Planned maintenance programme, there exists a backlog of urgent maintenance works required to be carried out on the Building elements, Services and Environment for the health and safety of the users.

Fig 6: BUILDING PERFORMANCE AND USER’S SATISFACTION RATING CHART



Source: Author’s Field Studies 2012

Building Performance Rating: ‘Poor’ if $0.10 < PR > 0.40$, ‘Medium’ if $PR = 0.50$, ‘Good’ if $0.60 < PR > 0.9$ ‘Excellent’ if $PR = 1$. **User’s Satisfaction Rating:** ‘Dissatisfied’ if $0.10 < SR > 0.49$ ‘Neutral’ if $0.50 < SR > 0.59$ ‘Satisfied’ if $0.60 < SR > 1.0$

CONCLUSION

Through the review of relevant literature and few statistical tests, this study has indicated through POE, the major failures and successes of the performance of the Federal Secretariat Complex, Minna. With the users as the benchmark for the evaluation, the study reveals that the building is in a **failed state of performance** due to poor maintenance. It is evident that the Federal Secretariat Complex Minna, is plagued with lack of maintenance/Unplanned maintenance and total neglect by the Federal Government. It is thus recommended that POE be adopted as a valuable, relevant, effective and successful approach to solving the backlog of maintenance works overdue for urgent attention at the Federal Secretariat Complex, Minna. It is also recommended that POE be adopted for analyzing the performance of the building, as well as serving as a building asset and facilities management tool for effective maintenance practices.

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APPENDIX A



Plate 1: Poor state the of the toilet facility
(Author’s survey 2012)



Plate 2: Drainage over-grown with weeds
(Author’s survey 2012)



Plate 3: Damaged structural beam
(Author's survey 2012)



Plate 4: Ripped off concrete Plastering
(Author's survey 2012)



Plate 5: Accumulated water on the Roof gutter
(Author's survey 2012)



Plate 6: Defected expansion joint.
(Author's survey 2012)



Plate 7: Damaged water pipes
(Author's survey 2012)



Plate 8: Defaced parapet walls
(Author's survey 2012)



Plate 9: Poor state of the interior of the offices
(Author's survey 2012)



Plate 10: Poor state of the Environment
(Author's survey 2012)

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