



## Condition Survey of Mechanical Services in the Staff Quarters of Nuhu Bamalli Polytechnic (Annex Campus), Zaria

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### ABSTRACT

*The objectives of this project were to; articulate the fundamental requirements for the design and installation of mechanical services in residential buildings, to conduct a visual inspection on the condition of mechanical services of the buildings, to evaluate the condition of the mechanical services in the residential buildings. The research work was carried out through site inspection of the nature and condition of mechanical services installed in the residential buildings of Nuhu Bamalli Polytechnic, Zaria. The study involves verbal interview with the principal quantity surveyor in the department of physical planning of the institute for necessary information. The study also involves data compilation by means of articulation of literatures to review the subject area. Data obtained were analyzed using simple statistical tools such as mean; percentage etc. During the course of the research, the highest defect found was problem with shower roses with about 100% occurrence and the least defects were soak away and water closet with only 25% each in KCAST 65-68 and KCAST 51-64 respectively. Ageing and lack of maintenance is a factor responsible for most of defects observed in the residential buildings surveyed. From the information gathered while interacting with the principal quantity surveyor of the institute, the only renovation observed in the past 8years was the removal and replacement of the entire roofing sheets and internal painting of the residential buildings.*

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### INTRODUCTION

The condition of quality of buildings is one of the most fundamental components of the quality of life. The vast majority of people spend over 95% of their time in or next to the building of one kind to another, So in this sense, the built environment has become our " natural" environmental. The condition of quality of buildings reflect public pride or indifference, the level of prosperity in the area, social values and behavior and all the many influences both past and present which combine to give community its unique character. There can be little doubt that dilapidated and

unhealthy buildings in a decaying environment depress the quality of life and contribute in some measures of antisocial behavior (Seeley, 1995).

The management of the existing physical facility is part of the overall process of building development, planning project, designing it, construction and management as a continuous cycle. It is therefore necessary to adopt some rational and appropriate systems for managing and maintaining buildings in particular in which the same principle can be adapted to other physical facilities. This can be achieved by physical



condition survey of the buildings or structures (Croft, 1995).

Building survey is a highly complex sphere of operations, involving interaction between the technical, social, legal and physical determinant which govern the use of buildings. A sound survey is obviously essential in any policy of conservation to know the condition of buildings. It implies the need for the surveyors to detect signs of repairs, programme on the selection of materials and method of construction (Oyefeko, 1999).

According to George T Hall (1984), a Survey can be defined as the physical and/or visual inspection of a property. Before a survey can be successfully carried out, reasons for executing process must be determined, these indicate the extent of such a survey, the information required prior to carrying out the survey, the equipment required, the information to be derived from the survey.

When a property is already subjected to economic or functional obsolescence, however, the care of its physical structure is more than to simply rectify every defect. Condition survey will balance the need of keeping the building and its premises in a reasonable condition. Furthermore, from the moment a building is developed, its physical performance starts to decline in its usefulness and value to obsolescence, repairs can control the pace of obsolescence, adaptation and improvement, provided the economic incentives to carry out the work is present. George T Hall (1984).

A building is a space envelope design to provide minimum level of comfort and convenience for the inhabitant. The fabric of the space envelope must be sufficiently strong to withstand wind pressure, rain effect and minimum soil movement (Siraj K.B, 2006). Buildings are built to protect people and their goods or possession from some aspects of natural weather. The cause of

many façade problems for example, originate in the way in which materials are specified to be put together and the type of materials chosen from various parts of the construction envelope. Either from lack of appropriate information about the construction sequence or from incorrect assumption of the end performance, unsuspected weakness appears first in architectural and engineering drawings and carried through to shop drawing and eventually built in by the construction team (Bokini, 2006).

It is important therefore, that ways be found to improve the communication between members of the construction team with regard to the design and performance of the buildings. The construction team (Builders and Designers) would welcome more information about the actual performance of various design configurations, e.g. Case histories of what “works”, what does not “works” and why (Bokini, 2006).

Given proper design and quality construction, buildings can normally be born safe and healthy from inception to completion for occupation. However, during the life span which may be in decades, it will be a tedious process to keep them always safe and healthy, and free of hazards and sickness. They require continues attention and commitment from those who occupy them, from those who uses them, from those who own them, and from those who manage them (Bolarinwa, 2006).

Good and solid buildings are expected to last for 100 years before consideration for renovation (Bokini, 2006). Most failures or performance shortfalls can be traced back to contravention of requirements (e.g. as contained in building regulations) or authoritative advices contained in BS1 standards and codes or in the publications of well recognized professionals, commercial or research bodies.



The ultimate goal of any condition survey program adopted is usually to optimize the smooth running of buildings and their facilities. The condition survey of a building and their fittings may be carried out for a number of purposes. The purpose of survey must be established before the commencement of the survey.

**METHODOLOGY**

This research work was carried out through site inspection of the nature and condition of mechanical services installed in the residential buildings of Nuhu Bamalli Polytechnic, Zaria. The study involves verbal interview with the principal quantity surveyor in the department of physical planning of the institute for necessary information. The study also involves data compilation by means of articulation of literatures to review the subject area. Data obtained were analyzed using simple statistical tools such as mean; percentage etc. and the results were presented in tables.

The population of the residential Quarters was obtained from the Department of Physical Planning of Nuhu Bamalli Polytechnic, Zaria through the principal quantity surveyor of the department. There were a total number

of about fifty four (54) houses in the area for both junior and senior staff with a gross floor area as follows; KCAST 27-50 182sqm, KCAST 51-64 144sqm, KCAST 65-68 246sqm, JSQ 1-12 224sqm.

The senior staff Quarters contained two (2) nos. bedroom flats, three (3) nos. bedroom flats and four (4) nos. bedroom flats, with a two-room boys quarters each. The junior staff quarters contained two (2) blocks A and B with six (6) nos. of two (2) bedrooms each, making the total number of flats for the two blocks to be 12.

Combinations of two sampling techniques were used for the research which results in stratified random sampling. Stratified sampling was initially used in which all the houses were grouped into different strata according to their type i.e. senior staff quarters category 1, senior staff quarters category 2, senior staff quarters category 3 and junior staff quarters. Eight houses were randomly selected from each and every stratum by the use of lottery method. In lottery method each of the N population numbers were assigned a unique numbers. The numbers were placed in a bowl and thoroughly mixed before n numbers were been selected by the researcher.

**Table 1:** Floor Area Distribution

STAFF QUARTERS	GROSS FLOOR AREA	NUMBER OF HOUSES	TOTAL AREA
KCAST 27-50	182sqm	24	4368sqm
KCAST 51-64	144sqm	14	2016sqm
KCAST 65-68	246sqm	4	984sqm
J.S.Q 1-12	224sqm	12	2688sqm
Total	796sqm	54	10056sqm

Source: Field Survey, (2015)



**Table 2:** Distribution of Sample Area

STAFF QUARTERS	GROSS FLOOR AREA/UNIT	TOTAL AREA ALLOCATED	NUMBER OF BUILDINGS SELECTED
KCAST 27-50	182sqm	1456sqm	8
KCAST 51-64	144sqm	1152sqm	8
KCAST 65-68	246sqm	984sqm	4
J.S.Q 1-12	224sqm	1792sqm	8
<b>TOTAL</b>	<b>796sqm</b>	<b>5384sqm</b>	<b>28</b>

Source: Field survey, (2015)

Data obtained were analyzed using simple statistical tools such as mean (average); percentages etc. and the results were presented in tables. The results were resolved based on how they relate to the research.

The study involved data compilation by means of;

1. Articulation of literatures to review the subject area.
2. Site inspection to assess the condition of mechanical services of the residential buildings.
3. Oral interview with the Principal Quantity Surveyor at the Department of Physical Planning of the institute.

## RESULTS AND DISCUSSION

From the survey conducted on mechanical services of residential buildings of Nuhu Bamalli Polytechnic, Zaria. The defects detected such as broken and blocked waste pipes, broken and malfunctioning water closet (WC), problems with shower rose, blocked and rusted drinking water pipes, unused kitchen sinks, wash hand basins with damaged fittings and connections, breakage of soak away covers and some septic tanks filled up, inadequacy of some septic tank structural stability, problems of heating and ventilation etc. were presented in the following tables:-

**Table 3:** Defects Detected in KCAST 27-50 in the Residential Buildings of Nuhu Bamalli Polytechnic (annex), Zaria.

ITEMS SURVEYED	TYPES OF DEFECTS IDENTIFIED	NUMBER OF FLATS SURVEYED	FREQUENCY OF FLATS WITH DEFECTS	% OF FLATS WITH DEFECTS
Waste pipes Fittings and Connections	Broken, leaked and corrode	8	4	50%
Water closet (WC)	Broken and malfunctioned	8	5	62.5%
Shower rose	Not connected	8	8	100%
Drinking water Pipes	Blocked and rusted	8	7	87.5%
Kitchen sinks and Wash hand basins	Damaged and malfunctioned	8	6	75%
Soak away	Breakage of Covers and Some septic Tanks filled up	8	4	50%
Heating	Malfunctioned	8	5	62.5%
Ventilation	Malfunctioned	8	5	62.5%

Source: Field Survey, (2015)



In this category, the highest defect found was problem with shower rose with about 100% occurrence and the least defect was problems with waste pipes fittings and connections, and soak away with about 50%. Ageing and lack of proper maintenance is responsible for most of the defects observed in the buildings. Waste pipes fittings and connection, water closet were not inspected and maintained for many years

which results in many defects. Shower roses were not been connected in any of the buildings. Many heating and ventilating appliances are not functioning due to lack of repair. In case of kitchen sinks and soak away maintenance in terms of inspection and repair is very poor due to negligence of either the occupants or the client. The result shows that repairs have not been done for a long period of time.

**Table 4:** Defects Detected in KCAST 51-64 in the Residential Buildings of Nuhu Bamalli Polytechnic (annex), Zaria

ITEMS SURVEYED	TYPES OF DEFECTS IDENTIFIED	NUMBER OF FLATS SURVEYED	FREQUENCY OF FLATS WITH DEFECTS	% OF FLATS WITH DEFECTS
Waste pipes Fittings and Connections	Broken, leaked and corrode	8	3	37.5%
Water closet (WC)	Broken and malfunctioned	8	2	25%
Shower rose	Not connected	8	8	100%
Drinking water Pipes	Blocked and rusted	8	7	87.5%
Kitchen sinks and Wash hand basins	Damaged and malfunctioned	8	5	62.5%
Soak away	Breakage of Covers and Some septic Tanks filled up	8	3	37.5%
Heating and	Malfunctioned	8	4	50%
Ventilation	Malfunctioned	8	4	50%

Source: Field Survey, (2015)

In this category, the highest defect found was also problem with shower rose with about 100% occurrence and the least defect was problems with water closet with about 25%. Ageing and lack of proper maintenance is responsible for most of the defects observed in the buildings. Waste pipes fittings and connection, water closet were not inspected and maintained for many years which results in many defects. Shower

roses were not been connected in any of the buildings. Many heating and ventilating appliances are not functioning due to lack of repair. In case of kitchen sinks and soak away maintenance in terms of inspection and repair is very poor due to negligence of either the occupants or the client. The result shows that repairs have not been done for a long period of time.



**Table 5:** Defects Detected in KCAST 65-68 in the Residential Buildings of Nuhu Bamalli Polytechnic (annex), Zaria

ITEMS SURVEYED	TYPES OF DEFECTS IDENTIFIED	NUMBER OF FLATS SURVEYED	FREQUENCY OF FLATS WITH DEFECTS	% OF FLATS WITH DEFECTS
Waste pipes Fittings and Connections	leaked and corrode	4	2	50%
Water closet (WC)	Malfunctioned	4	2	50%
Shower rose	Not connected	4	4	100%
Drinking water Pipes	Blocked and rusted	4	3	75%
Kitchen sinks and Wash hand basins	Malfunctioned	4	2	50%
Soak away	Breakage of Covers	4	1	25%
Heating and Ventilation	Malfunctioned	4	2	50%

Source: Field Survey, (2015)

In this category, the highest defect found was also problem with shower rose with about 100% occurrence and the least defect was problems with soak away with about 25%. Ageing and lack of proper maintenance is responsible for most of the defects observed in the buildings. Waste pipes fittings and connection, water closet were not inspected and maintained for many years which results in many defects. Shower

roses were not been connected in any of the buildings. Many heating and ventilating appliances are not functioning due to lack of repair. In case of kitchen sinks and soak away maintenance in terms of inspection and repair is very poor due to negligence of either the occupants or the client. The result shows that repairs have not been done for a long period of time.

**Table 6:** Defects Detected in JSQ 1-12 in the Residential Buildings of Nuhu Bamalli Polytechnic (annex), Zaria

ITEMS SURVEYED	TYPES OF DEFECTS IDENTIFIED	NUMBER OF FLATS SURVEYED	FREQUENCY OF FLATS WITH DEFECTS	% OF FLATS WITH DEFECTS
Waste pipes Fittings and Connections	Broken, leaked and corrode	8	5	62.5%
Scatting's	Breakage	8	3	37.5%
Shower rose	Malfunctioned	8	8	100%
Drinking water Pipes	Blocked and rusted	8	6	75%
Kitchen sinks and Wash hand basins	Damaged	8	7	87.5%
Soak away	Breakage of Covers	8	4	50%
Heating and Ventilation	Malfunctioned	8	7	87.5%
	Malfunctioned	8	6	75%

Source: Field Survey, (2015)



In this category, the highest defect found was also problem with shower rose with about 100% occurrence and the least defect was problems with scattings with about 37.5%. Ageing and lack of proper maintenance is responsible for most of the defects observed in the buildings. Waste pipes fittings and connection, water closet were not inspected and maintained for many years which results in many defects. Shower roses were been connected in this case but are not in use in any way. Many heating and ventilating appliances are not functioning due to lack of repair. In case of kitchen sinks and soak away maintenance in terms of inspection and repair is very poor due to negligence of either the occupants or the client. The result shows that repairs have not been done for a long period of time.

#### DISCUSSION OF RESULTS

The highest defect found was problem with shower roses with about 100% occurrence and the least defects were soak away and water closet with only 25% each in KCAST 65-68 and KCAST 51-64 respectively. Ageing and lack of maintenance is a factor responsible for most of defects observed in the residential buildings surveyed. According to Ikpo, (2006) building maintenance in addition to maintaining the building in a condition in which it continuous to fulfill its function also serves to preserve the value of investment and to present a good appearance of the buildings. From the information gathered during the interaction with the principal quantity surveyor of the institute, the only renovation observed in the past 8years was the removal and replacement of the entire roofing sheets and internal painting of the residential buildings. Before that renovation, the buildings have not been renovated for more than 15years. In addition, defects such as blocked and leaking waste pipes, rusted drinking water pipes observed were mostly due to ageing without replacement.

Kitchens sink and wash hand basins as earlier mentioned was also due to ageing and weathering.

#### CONCLUSION

1. The right to a safe and healthy environment should be respected at all levels. Doing so will greatly prevent or reduce defects in the environment.
2. The study revealed some short comings and negligence. Majority of the surveyed buildings suffer serious lack of maintenance.
3. The findings showed that the attitude of people towards the use and management of residential quarters is poor. This explains why there is a general and fast rate of deterioration in public buildings.
4. It was concluded that the staff quarters of Nuhu Bamalli Polytechnic are in a bad state of maintenance.
5. Mechanical services of few of the houses are in a good condition, some fairly good and many are in bad condition and need either a complete renovation or major maintenance work.
6. It was observed that few of the occupants make arrangements for maintenance work, majority of them do not.
7. Among all the problems observed, the ones with the highest percentage of occurrence are shower roses, drinking water pipes, kitchen sinks and wash hand basins.

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