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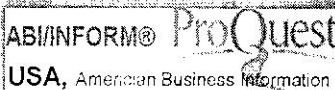
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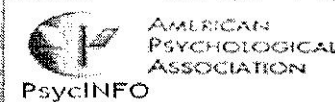
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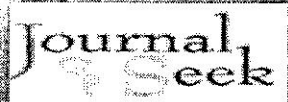
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POST-OCCUPANCY EVALUATION OF FACTORIES IN MINNA TO DETERMINE THE WORKING CONDITIONS OF STAFF

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ABSTRACT

This paper presents the results of a post- occupancy evaluation of selected factory buildings in Minna. A survey of registered and functional factories was undertaken to examine the condition of factories: staff working conditions, space management, and user satisfaction. The research investigated the technical aspects, environmental conditions, adequacy of space provision within factory buildings, personal protective equipment (PPE), Health and Safety (H&S) regulations and facilities standards, ventilation and maintenance standards of factories in Minna from the perspective of the workers. The research made some recommendations that would help entrepreneurs in the management of factories in Nigeria with useful guidelines for creating a better working environment for factory workers. The research concludes that post- occupancy evaluation should be carried out annually on factories so as to guarantee health and safety of the occupants.

Key words: *Building, Environment, Factory, Post-Occupancy Evaluation, Workers*

Introduction

A factory is a large industrial building where goods or products are manufactured (Edmonds and Nicholas, 2002). Basically, a factory is a complex network of functions, including: material storage, component manufacture, assembly, inter-process storage, packing, dispatch and transport interface; all of which must flow together. The history of factory development has been one of continually changing requirements following improvements in production equipment, mechanical handling and motive power associated with shift of philosophy from individual craftsmanship to robotic production line. Factories are one of the hazardous industries in most economies (Edmonds and Nicholas, 2002).

Conditions for workers in early factories were generally poor and this led to the development of Factory Health and Safety (H&S) regulations (HSE, 2002; HSS, 2003). Research studies in

factories trace the origin of H&S regulations generally to the UK and US (Clegg, 1979; Galbraith, 1989; Fellows, 2004). In Nigeria there is a lack of concern, accurate records and statutory regulations on health and safety for factories workers. Nigeria as a former colony of Britain depended solely on standards and regulations of her colonial master before and even after independence. As a result, almost all existing regulations of reference on H&S in Nigeria originated from foreign countries (Idoro, 2004). The existing Factory Act of 1990 is an adaptation of the UK Factory Act of 1961, while the Occupation Safety and Health Act of 1970 is an American legislation.

Factory development in Nigeria

Factory development and management in Nigeria has experienced two waves of dramatic change in the last decades. The first wave occurred between 1974 and 1980 after the oil price increase. The period saw an increase in the number of medium and large scale plants, following the intensification of the process of import substitution and the establishment of firms to undertake domestic manufacturing of goods previously imported (Oloyede, 1991). In general, the period was characterized by a transformation of the manufacturing sector with a massive increase in employment and the introduction of new technology. Alongside this development was the increasing importance of the specialist function of the management of personnel.

The second wave of the change occurred between 1980 and 1985. This was in the early period of the now well-documented Nigerian economic crises during which manufacturing declined dramatically (Olukoshi, 1989). A great number of firms closed plants, reduced production drastically and laid-off workers in their thousands. The changed economic condition also brought about pressures on manufacturing companies to change their manufacturing strategies. The change in both product and the labour markets mediated by new technology of production during the first wave, influenced the manufacturing towards gaining competitive advantage (Oloyede, 1992). But manufacturing strategies during the second wave were simply reflections of a pragmatic response to the dramatic down turn in economic activity in Nigeria. There was the adoption of the maximisation of profit through the maximum utilisation of machines of production many of which were fast becoming outdated and obsolete owing to lack of spare parts, a consequence of the scarce foreign exchange with which to purchase them.

Involvement of Workers in Management

Prior to the 20th Century, managers did not consider it very important to consult with their workforce to determine the suitability of the working conditions. Frederick Taylor in his time and motion studies of factory workers and office conditions is credited with being the founder of the movement known as scientific management (Trist, 1984). Taylor's work contributed to the improvement of working conditions and the introduction of Health and Safety regulations in the United States of America at the turn of the 20th Century. However, it was after the Hawthorne factory experiment carried out by Elton Mayo in Chicago in the early 1930s that it became clear that improved productivity could be achieved by ensuring that the workers were fully involved in decisions affecting their working environment. Employees realise that their views are important and this encourages feelings of personal responsibility, hence they become more motivated and committed to their jobs (Barrett, 1995).

Post-Occupancy Evaluation (POE)

POE is a method of measuring the performance of a building in use, with respect to the brief, the goals of the design team, and the activities and feelings of the users (Van Wagenberg, 1989). POE can be used to provide information for upgrading or improving existing facilities (Ellis, 1988). The process of POE includes:

- i. Study and analysis of as-built drawings.
- ii. Preparation of questionnaires for management and workers in the building(s).
- iii. Walk-through evaluation – this involves a complete physical examination of the building by the POE team.
- iv. Interviews – the POE team finally interviews selected personnel at the end of the walkthrough (Zubairu, 2002).

The POE of the factories in this study was done to ascertain the working conditions as perceived by the workers in conjunction with the physical evaluation done by the POE team during the walkthrough.

Research Methodology

The research is part of a post-occupancy evaluation (POE) study carried out on factory buildings in Niger State, Nigeria. This was done through direct observation and review of collated data from the existing factories in Niger State. The choice of a direct observation survey was to allow for the researcher to locate some of the factory buildings for proper

assessment which cannot be gotten if a questionnaire were to be used. The research covered the whole of Minna the Niger State capital.

Factories in Minna, Niger State

Niger state was created in 1976 with Minna as its capital city. Minna developed as a railway town linking the former capital of Nigeria, Lagos with the biggest commercial city in the northern part of Nigeria, Kano. The industries in Minna are mainly small and medium scale. The number of registered factories in Minna as at June 2008 was 26. They are:

1. Abu-Turab Feeds Limited
2. Abu-Turab Poultry Limited
3. Kad Engineering Limited
4. Tomi-Zayi Limited
5. Water Search Nigeria limited
6. Sawn Mill and Furniture Limited
7. Al-Habib Pottery Centre
8. Northern Enterprise Limited
9. Ashwin Nigeria Limited
10. Bakai Heveltica
11. Dana Pharmaceutical
12. Tagwai Bakery and Confectionery
13. Imurat International Limited
14. Golden Nut Oil Limited
15. AbuTurab Rice Processing Mill Limited
16. Niger Flour Mill Limited
17. A and Shine Honey Limited
18. Ebanshin Nigeria Limited
19. Maizube Farms
20. Jochips Nigeria Limited
21. Owin Nigeria Limited
22. Takimo Kampala
23. Morris Nigeria Limited
24. White Heart Limited
25. El-amin Bakery and Confectionery
26. Ola sawn Mill and Furniture Company

A post-occupancy evaluation exercise was carried out by post graduate research students of the Department of Architecture, Federal University of Technology Minna, in 2008 to determine the working conditions of the registered factories in Minna. All the 26 factories listed above were visited by the research groups and only nine were found to be fully operational. They are:

1. Golden Nut Oil Limited
2. Imurat International Limited
3. Maizube Farms
4. White Heart Limited
5. Takimo kampala
6. Al-Habib Pottery Centre
7. Ola sawn Mill and Furniture Company
8. Abu-Turab Feeds Limited
9. El-Amin Bakery and Confectionery

The management of El-Amin Bakery and Confectionery did not permit the research team to carry out a POE of their factory so the data presented below is based on data obtained from

eight factories in Minna. It should be noted that there are other small scale industries operating in Minna but they are not registered with the Niger State Ministry of Commerce and Industries and they were not included in this study.

Staff Personal Data

Table 1 below provides information on the sex, age and qualifications of the factory workers. Two factories, Maizube farms and Olasawn Mill & Furniture had 100% male workforce, while Golden Nut Oil and Imurat were the only factories that had more female workers than male. Most of the workers were in the 25-35 year age bracket. The highest qualification was either secondary or tertiary education in most of the factories except for White Heart where the highest qualification was primary education only.

Table 1: Staff personal data

S/No.	Factory	Sex		Age			Qualification		
		M (%)	F (%)	18-25 (%)	25-35 (%)	35 & Above (%)	Primary (%)	Secondary (%)	Tertiary (%)
1	Golden Nut Oil	20	80	0	65	22	0	34	66
2	Imurat International	33	67	22	44	22	12	33	22
3	Maizube Farms	100	0	0	33	67	18	25	57
4	White Heart	86	14	42	14	33	43	29	28
5	Takimo Kampala	50	50	50	50	0	0	0	100
6	Al-Habib Pottery	90	10	50	30	20	0	100	0
7	Olasawn Mill & Furniture	100	0	0	0	100	0	100	0
8	Abu-Turab Feeds	90	10	0	60	90	0	90	10

Source: POE team, Dept. Of Architecture, F. U. T. Minna (2008)

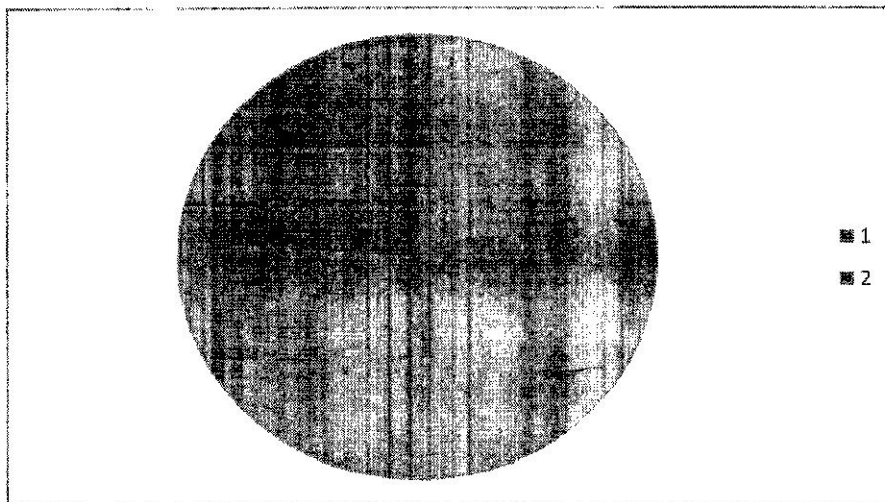
Space management

Space management is the planning and organising of space and equipment in a building in a cost-effective manner, to meet the changing requirements through time, of the organisation occupying the building. The POE team, during the walkthrough evaluation of the factories, assessed how effectively the spaces in the factories were arranged. Table 2 indicates that the space management was generally good in all the factories except for White Heart.

Table 2: Space management

S/No.	Factory	Good (%)	Poor (%)
1	Golden Nut Oil	53	47
2	Imurat International	67	33
3	Maizube Farms	80	20
4	White Heart	30	70
5	Takimo Kampala	100	0
6	Al-Habib Pottery	100	0
7	Olasawn Mill and Furniture	90	10
8	Abu-Turab Feeds	89	11

Source: POE team, Dept. Of Architecture, F. U. T. Minna(2008)



1=good condition

2=poor condition

Figure 2: Showing the space management of factories in Minna.

User Satisfaction

When workers are satisfied with their working conditions, they tend to be more productive. Table 3 indicates the level of satisfaction of the workers with their working environment. The results indicate that most of the workers were satisfied except for White Heart and Abu-Turab Feeds where 60% of the workers were dissatisfied with their working conditions.

Table 3: User satisfaction

S/No.	Factory	Satisfied (%)	Dissatisfied (%)
1	Golden Nut Oil	56	44
2	Imurat International	70	30
3	Maizube Farms	80	30
4	White Heart	40	60
5	Takimo Kampala	80	20
6	Al-Habib Pottery	79	21
7	Olasawn Mill and Furniture	86	14
8	Abu-Turab Feeds	40	60

Source: POE team, Dept. Of Architecture, F. U. T. Minna (2008)

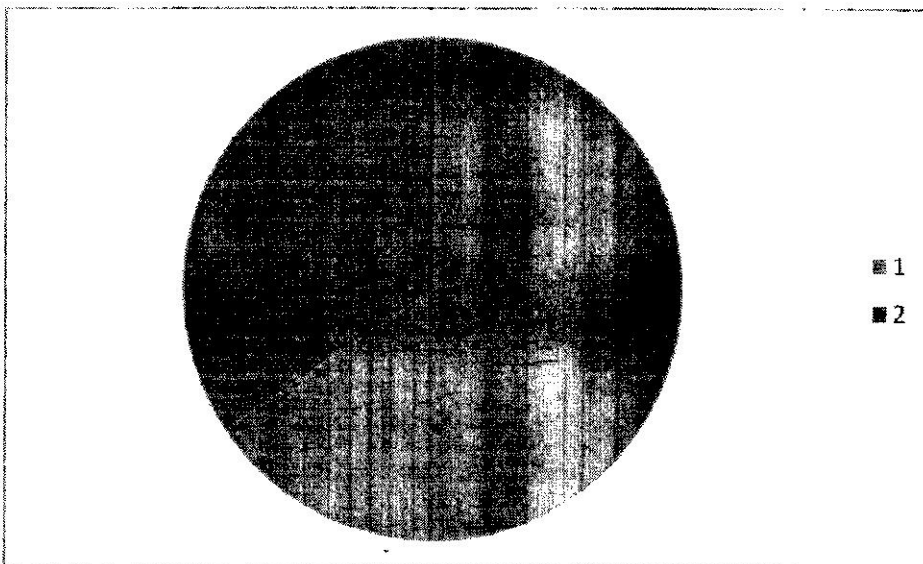


Figure 3: Showing the user satisfaction of factory staff in Minna.
1=Satisfied
2=Dissatisfied

Findings of the Study

From the survey of the functional factories in Minna, it is observed that there are more male factory workers than females. This is not unexpected as factory work in Nigeria has generally been male dominated. Majority of the workers are in the 25-35 year age bracket. Most of the staff are secondary school certificate holders. In the space management, it is seen that most factories in Minna have an above average space management – Ventilation and lighting are fairly good except for a few of the factories. Most of the workers are satisfied with the working environment. Space for movement of workers between equipment is adequate though room for expansion is lacking in most of the factories. Only one of the factories has a clinic and only few have first-aid boxes. Personal protective clothing and equipment were lacking in most of the factories. Maintenance of the factories needs to be improved upon. The interiors of most of the factories were overdue for re-painting. The exterior of most of the factories needed attention especially cutting of grasses and landscaping.

Recommendations

Factory Health and Safety regulations

These regulations need to be properly enforced in factories in Nigeria. Health inspectors should carry out periodic inspections to ensure compliance. First-aid boxes containing all specified materials must be provided in all factories.

Factory Personal Protective Equipment (PPE)

HMSO (2002) describes PPE as any device or appliance designed to be worn or held by and for protection against one or more health and safety hazards. Two notable regulations namely: Factory Act of 1990 and the Personal Protective Equipment (PPE) Regulations of 2002 are specifically concerned with regulating the use of PPE. The Factory Act of 1990 is the Nigerian version of the Factory Act of Britain. It is enacted and came into force in 1990. Articles 47 and 48 contain regulations on the provision of PPEs for workers. By this provision, all factories must comply with this act that stipulates workers to have protective clothing, helmet, safety boot, hand globe, eye and ear protectors.

Adequate Ventilation and Lighting

It was observed from the survey that some of the factories need to improve on the ventilation and lighting conditions to maximize the comfort of the workers. In Nigeria, it is stipulated in the Development Control Standards and Building Regulation that: "all buildings shall have adequate through and cross ventilation. All rooms shall have at least one window opening into the external air and the area of such windows shall not be less than one tenth of the floor area. If windows or a window and door are not placed opposite themselves in a room, there shall be provided on the wall a ventilator" (FCDA, 1988). This standard must be enforced in all factories.

Adequate maintenance of factory buildings

Poor maintenance practices in developing countries have negative impacts on the environment and public health (Habitat, 1993). From the survey carried out it was observed that most of the factories in Minna are poorly maintained. Planned maintenance of factory building and its facilities is of prime importance.

Provision of staff clinics and fire extinguishers

Staff clinics need to be located within the factory premises as only one had a clinic in the premises. Adequate fire extinguishers should be provided and installed at appropriate position maintaining standard regulations of the Factory Act.

Conclusion

The survey has provided information on condition of factory workers, their attitude about the job and working environment. Organisations and individuals who own and manage factories and their occupants should be aware of the roles they need to play in ensuring that they maintain a good working environment for the workers. The Factory Health and Safety Regulations must be reviewed from time to time to take cognisance of technological developments. These regulations need to be enforced in all factories in Nigeria. It is therefore recommended that post occupancy evaluation be carried out regularly on factories so as to guarantee health and safety of the occupants.

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