

**THE IMPACT OF OFFICE ERGONOMICS ON EMPLOYEE
PERFORMANCE; A CASE STUDY OF THE GHANA
NATIONAL PETROLEUM CORPORATION (GNPC)**

By

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requirements for the degree of**

**COMMONWEALTH EXECUTIVE MASTERS OF BUSINESS
ADMINISTRATION**

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DECLARATION

I hereby declare that this submission is my own work towards the Executive Masters of Business Administration and that, to the best to my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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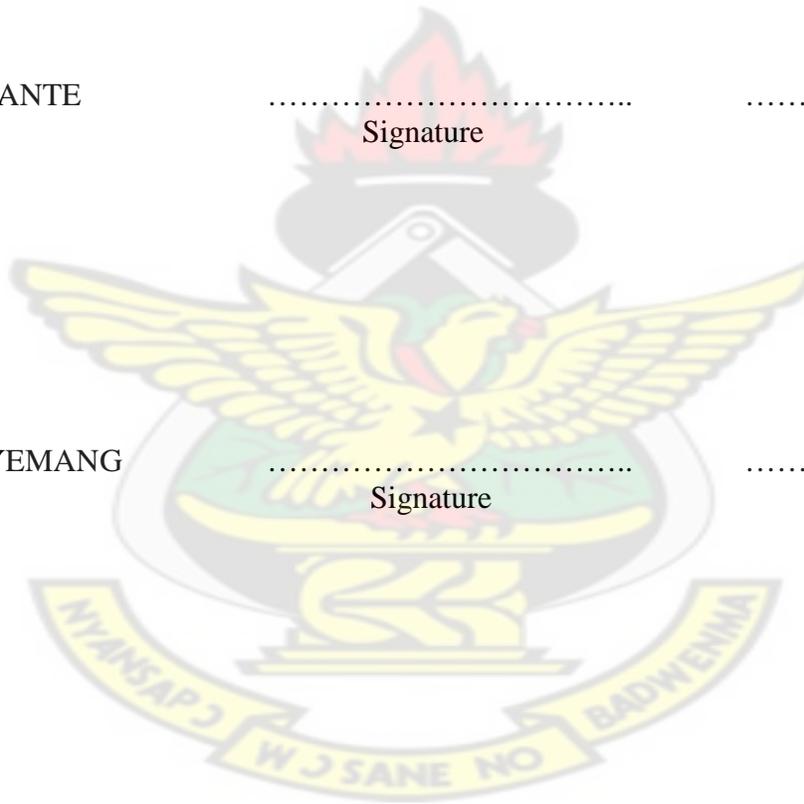
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ABSTRACT

Office ergonomics is a widely acceptable means of providing an enabling environment that best facilitates employees' performance and general productivity. This study sought to find out the impact of office ergonomics on employee performance using the Ghana National Petroleum Corporation (GNPC) as a case study. The objectives of the study were to analyze the office design, finishes and furnishing of the head office building of GNPC, identify ergonomic features in the design, finishes and furnishing in terms of their suitability and comfort of the employees, assess the impact of office ergonomics on the performance of GNPC employees at the Petroleum House in Tema and finally propose specific ergonomically based interventions that would address employee health, comfort and wellbeing and thereby enhance optimum performance. The study was based on a sample of 88 GNPC staff randomly drawn from various departments and units at the Petroleum House, as well as 10 senior managers. Data for the study obtained mainly from the administration of questionnaires was analyzed quantitatively using the SPSS and Microsoft Excel and presented with the aid of frequency distributions, pie charts, tables, pictures and graphs. The research identified considerable office ergonomic deficiencies which included uninspiring and old-fashioned office design and décor (largely cellular offices), use of dark wooden partitions resulting in poorly illuminated offices, and continuous use of un-ergonomic furniture at the Petroleum House. The study also confirmed that the ergonomic deficiencies have had varying adverse effects on the performance of GNPC employees by between 20-80 percent. The study recommends the relocation of the GNPC head office to a new modern facility designed and furnished to suit the peculiar needs of the Corporation. The development and operation of a Real Estate Policy that leverages on the workplace environment to attract, retain and boost employee performance has also been recommended.

DEDICATION

I dedicate this work to my cherished wife Rebecca Naa Adaawa Asante and my priceless sons:

Nigel Boamah Asante and Caelan Addo Asante.

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ACKNOWLEDGEMENT

I am forever grateful to the Almighty God, the maker of heaven and earth for endowing me with excellent health, knowledge and wisdom to complete this work successfully.

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I believe that I couldn't have attained any personal development especially to this level without the prayers and counsel of my dear parents Mr. and Mrs. Asante. I wish them long life, prosperity and amazing grace from the good God

To the various authors whose works were consulted in the course of writing this thesis and to the wonderful respondents at GNPC who took time off their busy schedules to respond to the questionnaires, I say thank you and God richly bless you all.

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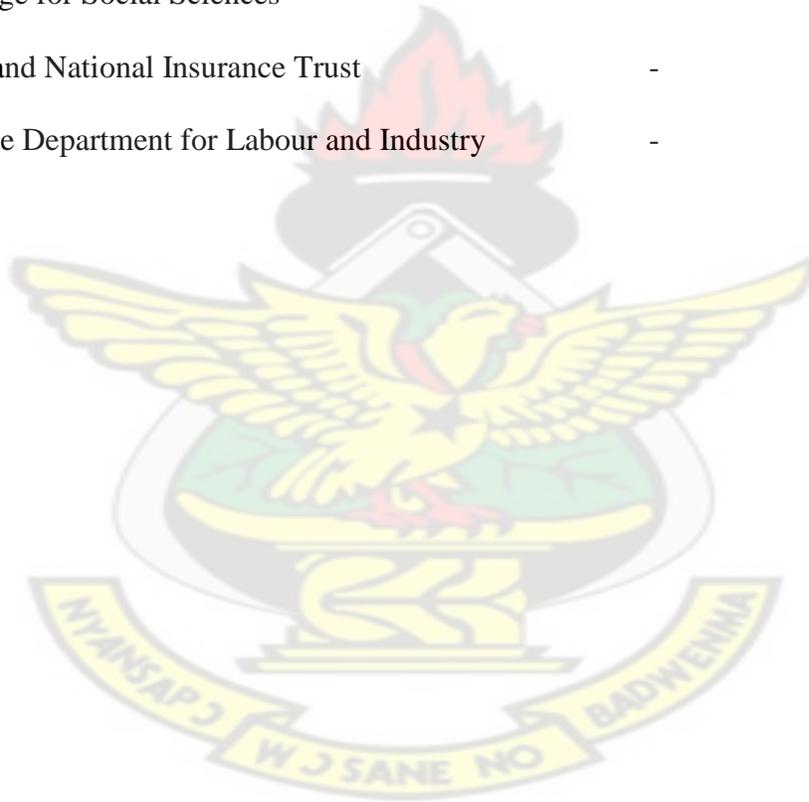


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LIST OF ABBREVIATIONS

Commonwealth Executive Master of Business Administration	-	CEMBA
Ghana National Petroleum Corporation	-	GNPC
Health and Safety Executive	-	HSE
International Ergonomics Association	-	IEA
Information Communication Technology	-	ICT
Kwame Nkrumah University of Science & Technology	-	KNUST
Statistical Package for Social Sciences	-	SPSS
Social Security and National Insurance Trust	-	SSNIT
Washington State Department for Labour and Industry	-	WSDLI



CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

In the past few decades, there has been a strong trend for corporate organizations and businesses to reconfigure the spaces of their offices in new ways and models. In addition, the shift towards more exciting and flexible workplace environment and the need to meet the diverse and growing expectations and requirements of different employees has led to the rise of debates about how and where productive work is accomplished. In a 2003 survey by *Management Today* magazine, virtually all (97 per cent) of respondents said that they regarded their place of work as a symbol of whether or not they were valued by their employer.

Office ergonomics has been recommended by many studies as one of the key guides to equipping employees at the workplace to help produce best performance. It is the quality of the employee's workplace environment that most impacts on the level of employee's motivation and subsequent performance. How well they engage with the organization, especially with their immediate environment, influences to a great extent their error rate, level of innovation and collaboration with other employees, absenteeism and, ultimately, how long they stay in the job Al-Anzi (2009).

According to International Ergonomics Association (IEA), (2000) Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles,

data and methods to design in order to optimize human well-being and overall system performance. Washington State Department for Labour and Industry (2002) identifies Office Ergonomics and defines it as the branch of ergonomics dealing specifically with the office environment. This field of ergonomics considers how key workplace elements such as workstations, computers, chairs, lighting, noise level, room temperature etc. could be tailored to fit and enhance employee health, safety and performance. From the definition, the goal of office ergonomics is to set up office work space that fits and adequately supports the needs of the employee in his quest to execute a task.

It focuses on how offices are designed and laid out; furniture and equipment are set up in the workplace. In addition, ergonomics consider the impact of other workplace elements such as air quality, noise levels, colour schemes, room temperature, lighting, general flexibility on employee performance. Generally, from the corporate perspective, the performance of an employee is often assessed largely by the output that employee produces, given the requisite workplace environment, tools, technology, skill set among others etc.

Studies have revealed that among some of the factors that affect employee performance are; employee's ability to learn and perform the task required, expectations to achieve and standards by which to achieve them, knowledge and skills necessary to perform the job, feedback from management regarding the status of the employee's performance, acceptable working conditions and equipment to perform the job effectively, incentives in place that positively reinforce good performance.

Dr. Michael O'Neil, Senior Director of Workplace Research at Knoll Incorporated in his article "Office Ergonomic Standards; Layperson's Guide" published in 2011 asserts that Furniture designed using ergonomic principles can improve performance and reduce workplace injury. According to Gutnick (2007), a study by The National Safety Council established that on an average workday, one million employees will be absent from work due to job stress

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Other researchers such as Taiwo (2009), claims that about 86% of productivity problems reside in the work environment of organizations. The work environment has effect on the performance of employees. The type of work environment in which employees operate determines the way in which such enterprises prosper.

Although other organizational elements such as praise and recognition, compensation and financial reward impact on employee performance, studies have also shown that an employee's workplace environment is a key determinant of their level of performance. How well the workplace engages an employee impacts their level of motivation to perform. Indeed poor workplace environment influences employees: health and safety, error rate, level of innovation, collaboration with other employees, absenteeism and, ultimately, how long they stay in the job.

In Beer et al. (1994) as cited in Taiwo (2009), we observe that work systems do not only affect commitment, competence and cost effectiveness but also have long term effects on physical health, mental health and longevity of life of employees.

One major benefit derived from pursuing office ergonomics is that it reduces the risk of injury by adapting the work to fit the person instead of forcing the person to adapt to the work. In addition to injury prevention, ergonomics is also concerned with enhancing work performance, by removing the barriers that exist in many work places that prevent employees from performing to the best of their abilities. This ultimately helps people work more effectively, efficiently, and productively at their jobs (Washington State Department of Labor and Industries, 2002). According to the Washington State Department of Labor and Industries (2002) ergonomics improvements to the work environment are primarily used to create a safer and more healthful work environment, and that a company may experience other benefits including increased productivity, increased work quality, reduced turnover, reduced absenteeism, and increased morale.

According to the Washington State Department of Labor and Industries (2002), if workers are required to adapt to a job that exceeds their body's physical limitations, they can become injured, especially with Work-related Musculoskeletal Disorders (WMSD's), which account for over 40% of all Washington State Fund workers' compensation claims among office workers. Numerous studies have shown that employee performance and satisfaction are substantially impacted upon by key elements in the office environment such as furniture, noise levels, lighting, temperature, air quality and general comfort.

Researchers in Ghana have over the year's demonstrated little interest in the subject of ergonomics and for that matter office ergonomics. As a result research material on the subject appears to be scanty. One of the few studies on ergonomics in Ghana was in respect

of occupational disorders in Ghanaian subsistence farmers (McNeil and O'Neil, 1998). Afrodan Ltd, one of Ghana's renowned suppliers of office furniture has over the years sought to sensitize Ghanaians on the immense benefits of high quality ergonomic and durable office furniture through consistent advertisement and occasionally in-studio promotions on Joy FM.

Although studies on ergonomics in Ghana have not been substantial, empirical evidence suggests that the application of ergonomic principles and theories in corporate offices in Ghana is rife. Most corporate offices in Ghana are increasingly mimicking layouts and finishes which to a large extent typify corporate offices in the advanced world. Evidently, these offices comprise of thoughtfully designed open plan and cellular offices with lush décor, automated work systems and ICT infrastructure that supports employee safety, communication, comfort, motivation and general performance.

The Head Office of the Ghana National Petroleum Corporation (GNPC) which is the focus of this study appears to be lagging behind the race for contemporary ergonomic offices. Considerable number of the offices, furniture and equipment at the GNPC Head office appear to be lacking ergonomic considerations. The study therefore examines the state of the GNPC offices and further assesses whether or not they impact on the performance of the employees at GNPC.

1.2 PROBLEM STATEMENT

A well designed and furnished office signals the values and objectives of the company and communicates the company's strategic and overall corporate goals to both employees and clients. Office ergonomics attaches great importance to well-designed workspace, functional workstations, and general interior décor. All these factors definitely have a direct and indirect impact on employee performance, productivity, profit margins, and also the sustainability and competitiveness of the business.

Employee efficiency and enhanced productivity is assumed to be the result of better workplace environment. Superior workplace environment coupled with the requisite tools, technology, policies and strategies go a long way to boost employees performance and ultimately improve their productivity.

Hameed (2009) in the Journal of Public Affairs, Administration and Management (2009) reports of a research carried out in 2006 relating to; workplace designs, work satisfaction, and productivity. In the said research, 89 percent of the respondents rated design, from important to very important. Almost 90 percent of senior officials revealed that effective workplace design is important for the increase in employees' productivity. The final outcome of the survey suggested that businesses can enhance their productivity by improving their workplace designs.

Literature on the study of multiple offices and office buildings indicate that factors such as dissatisfaction, cluttered workplaces and the physical environment are playing a major role in the loss of employees' productivity (Carnevale 1992, Clements-Croome 1997).

In Ghana, few state organizations and private enterprises pay particular attention to their workplace environment, as well as work processes. Some corporate offices such as GNPC's Head Office (The Petroleum House) continue to use noisy window unit air-conditioners in fairly illuminated offices which obviously have the capacity of affecting the cognitive abilities and health, and overall productivity of the users of the facility.

Indeed, some of the chairs currently in use at GNPC's Head Office are without adjustable or ergonomic features. It is therefore feared that due to long term poor sitting posture, a number of the employees in GNPC may have suffered various degrees of back, spine, neck and stress related ailments. In the mist of these challenges at the workplace, management however, expects employees of all categories to put up their best performance to help in the attainment of set corporate objectives and goals.

The typical Ghanaian worker often finds himself/herself in a workplace environment that, to a large extent lacks the congenial atmosphere that safeguards his safety and overall interests. In order to highlight the need for better office ergonomics as a way of enhancing the efficiency and effectiveness of the worker, this study examined the impact of office ergonomics on employee performance in one of Ghana's high ranking public sector institutions, the Ghana National Petroleum Corporation. The study established the need for

the integration of office ergonomics in the formulation of corporate strategic objectives to help facilitate employee performance and satisfaction.

1.3 OBJECTIVES OF THE STUDY

The principal objective of the work was to assess the impact of office ergonomics on the performance of employees of the Ghana National Petroleum Corporation. The specific objectives were to:

1. Analyse the office design, finishes and furnishing at the Ghana National Petroleum Corporation, specifically the Head Office Building in Community 1, Tema;
2. Identify ergonomic features in the design, finishes and furnishing in terms of their suitability and comfort of the employees;
3. Assess the impact of office ergonomics in the Petroleum House on the performance of GNPC employees at the Petroleum House;
4. Propose specific ergonomically based interventions that would address employee health, comfort and wellbeing and thereby enhance optimum performance.

1.4 RESEARCH QUESTIONS

The research addressed, and was guided by the following questions:

1. How is the office space, furnishing and finishes of the Ghana National Petroleum Corporation designed, particularly with respect to meeting the expectations of employees?
2. What is the impact of the office ergonomics in the Petroleum House on the performance of employees?

3. In what ways can office ergonomics be enhanced to meet the comfort and satisfaction of employees so as to ensure better job performance and raise productivity?

1.5 LIMITATIONS OF THE RESEARCH

The study and conclusions thereof were based on primary data, which was basically the responses of the respondents; and thus may not represent the actual situation on the ground due to personal perspectives and beliefs. However, the questionnaires were tactfully structured to help identify inconsistencies, traces of bias and lack of objectivity in responses. The relatively small sample size was also expected to limit the extent to which the results and findings from the study could be generalized. To deal with this anticipated limitation, the sample was randomly selected from all the identifiable Departments, Units and groups at GNPC to ensure fair and adequate representation. The time span within which the study was conducted to some extent put a limit to the depth to which the theme of the study could have been analyzed. However, time was prudently managed within the scope of the study to ensure that the objectives of the study were met.

1.6 RELEVANCE AND JUSTIFICATION OF THE RESEARCH

The employee is the ultimate user of the workplace environment, it is therefore imperative that the workplace is designed and equipped to suit the needs of the employee. Office environments need to be designed around the idea that the employee is the most important aspect to consider during design. Buildings need to be designed to appeal and inspire the person that passes by, but more importantly, it must inspire those who work in them (Stoessel, 2001). In the advanced countries where ergonomic workplace environment is used

to attract, retain competent employees and further stimulate their performance, the elements of office ergonomics have been adequately studied and utilized to enhance performance. In Ghana however, less attention is paid to office ergonomics as one of the means to enhance performance and ultimately the bottom line. It appears adequate research has not been done on the subject and its impact on the performance of the average Ghanaian employee. The aim of this study is to buttress the evidence that leads to the need for a thoughtfully designed and ergonomic office environment that will maximize employee performance in Ghana.

1.7 ORGANISATION OF THE THESIS

The study is presented in five chapters. Chapter one introduces the work and deals with the background to the study, statement of problem, research objectives, research questions, relevance and limitations of the study. Chapter two situates the work within the scholarly context by examining literature pertaining to several aspects of the work. The methodology adopted for the work is outlined in chapter three, together with profile of Ghana National Petroleum Corporation, the case study. Chapter four presents the results of the fieldwork and the accompanying discussions. The last chapter, chapter five, looks at the summary, conclusions and recommendations emerging from the work. It also proposes areas for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Many business executives are under the mistaken impression that the level of employee performance on the job is proportional to the size of the employee's compensation package. Although compensation package is one of the extrinsic motivation tools, it has a limited short term effect on employees' performance. A widely accepted assumption is that better workplace environment motivates employees and produces better results (Leblebici, 2012).

Essentially, an elegant and functional workplace environment often culminates in improved employee efficiency and productivity. In recognition of this fact, most offices are now designed and furnished with the employee in mind to ensure that his workplace environment including furniture and equipment adequately supports and induces high performance. The quest to equip employees and workers with most suitable workplace environment, furniture, equipment, tools and techniques to discharge their duties efficiently and effectively is the fundamental philosophy behind the development and growth of ergonomics. The performance of an employee is measured actually by the output that the individual produces and it is related to productivity. At corporate level, productivity is affected by many factors such as employees, technology and objectives of the organization. It is also dependent on the physical environment and its effect on health and employees' performance (Al-Anzi, 2009).

2.2 WORKPLACE ENVIRONMENT

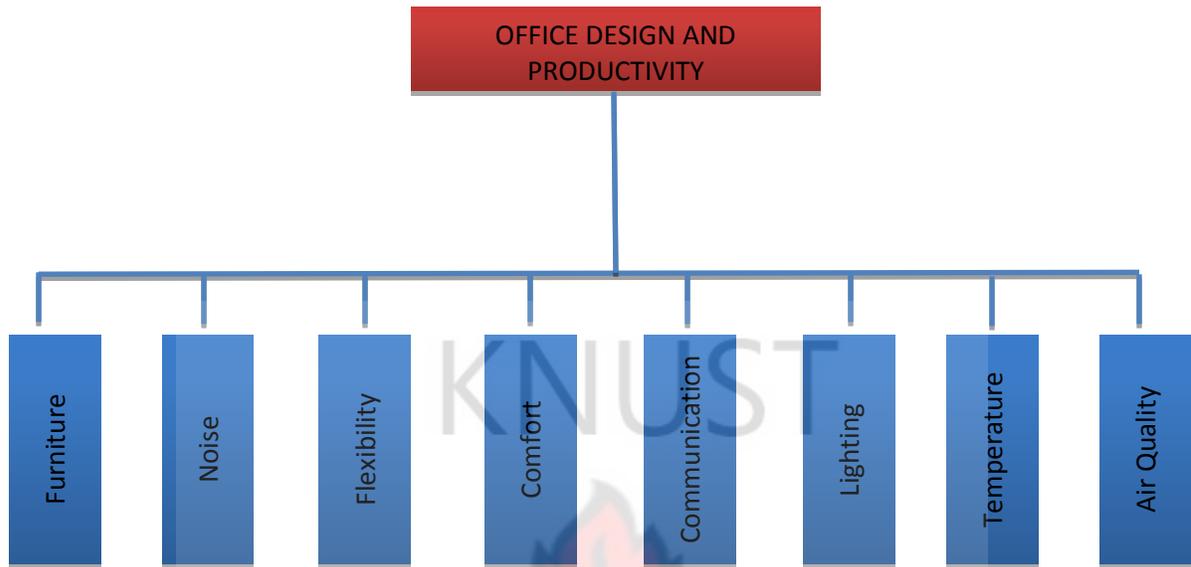
BusinessDictionary.com (2012) defines workplace environment as a location where a task is completed. When pertaining to a place of employment, the work environment involves the physical geographical location as well as the immediate surroundings of the workplace, such as a construction site or office building. Typically involves other factors relating to the place of employment, such as the quality of the air, noise level, and additional perks and benefits of employment such as free child care or unlimited coffee, or adequate parking. Besides manufacturing plants and other specialized production unit, nearly all employee productive activities take place in the office environment. In other words, most workplace environments are fundamentally office environments.

Office environment as defined by BNet Business Dictionary (2008) and cited in Hameed (2009) is, *“the arrangement of workspace so that work can be performed in the most efficient way”*. Office design incorporates both ergonomics and work flow, which examine the way in which work is performed in order to optimize layout. Office design is an important factor in job satisfaction. It affects the way in which employees work, and many organizations have implemented open-plan offices to encourage teamwork. Office design is very vital in employee satisfaction, and the broad concept of office design also includes the workflow.

2.3 KEY ELEMENTS IN THE OFFICE ENVIRONMENT

A productive office environment consists of a number of elements. Al-Anzi (2009) identifies; furniture, noise, flexibility, comfort, communication, lighting, temperature and air quality as the constituents of an office design and productivity. These elements are shown on Figure 2.1

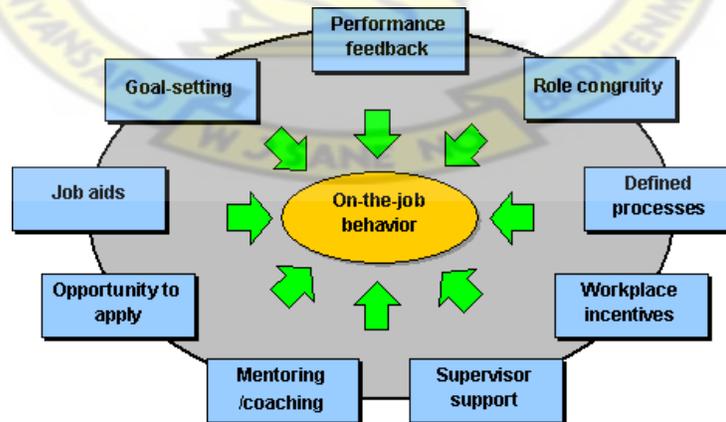
Figure 2.1: Office Design and Productivity



Source: Al-Anzi (2009)

In addition to these elements, Leblebici (2012) identifies the variables on Figure 2.2 below as some of the elements at the workplace environment that may lead to the engagement or disengagement of employees.

Figure 2.2: Workplace factors affecting employee performance



Source: (http://www.businessperform.com/workplace-training/workplace_environment.html)

Statt (1994) as cited by Leblebici (2012) argues that, the modern work physical environment is characterized by technology; computers and machines as well as general furniture and furnishings. To enhance employee performance therefore, it is imperative that the organization's physical environment is fashioned to support employee in their quest to attain organizational objectives.

2.4 ERGONOMICS AND BRANCHES

According to International Ergonomics Association (IEA), (2012) Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. A publication by the Health and Safety Executive (HSE), UK in 2003: "*Understanding Ergonomics at Work*" also defines Ergonomics as the scientific study of human work. It considers the physical and mental capabilities and limits of the worker as he or she interacts with tools, equipment, work methods, tasks and the working environment. The publication further postulates that the application of Ergonomics to workplace improves health and safety by: reducing the potential for accidents, reducing the potential for injury and ill health and improves performance and productivity. Ergonomics permeates every aspect of human endeavour. As a result, various branches or concepts of Ergonomics have evolved and developed over the years. Some of the branches are:

Office Ergonomics – Washington State Department for Labour and Industry in its document: "*Office Ergonomics – Practical Solution for a Safer Workplace (2002)*" identifies

Office Ergonomics and defines it as the branch of ergonomics dealing specifically with the office environment. This field of ergonomic considers how key workplace elements such as workstations, computers, chairs, lighting, noise level, room temperature etc. could be tailored to fit and enhance employee health, safety and performance.

Other areas of Ergonomics identified and posted at the Blog: Safecomputingtips.com includes the following;

Engineering Psychology – *“This field of study examines the relationship between machines and human beings, along with the effort to improve that relation. Possible recommendations of the study could inform change in the location of the work place, redesigning of work equipment and modifications in the way that work related equipment is used. The aim is to make things as user friendly as possible”.*

Macro ergonomics – *“This field is less of person specific and concentrates more on the organizational environment including the history, culture, goal and design of the environment.*

The aim of this field of ergonomics is to improve productivity and enhance employee satisfaction, health and safety”.

The International Ergonomics Association (IEA) identifies three main application domains of ergonomics. These include Physical Ergonomics, Cognitive Ergonomics and Organizational Ergonomics.

Physical Ergonomics

Physical ergonomics is concerned with human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity. The focal areas include working postures, materials handling, repetitive movements, work-related musculoskeletal disorders, workplace layout, safety and health.

Cognitive Ergonomics

Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system. The main focal areas include mental workload, decision-making, skilled performance, human-computer interaction, human reliability, work stress and training as these may relate to human-system design.

Organizational Ergonomics

Organizational ergonomics is concerned with the optimization of sociotechnical systems, including their organizational structures, policies, and processes. The key focal areas include communication, crew resource management, work design, design of working times, teamwork, participatory design, community ergonomics, cooperative work, new work paradigms, organizational culture, virtual organizations, telework, and quality management.

2.5 OFFICE ERGONOMICS

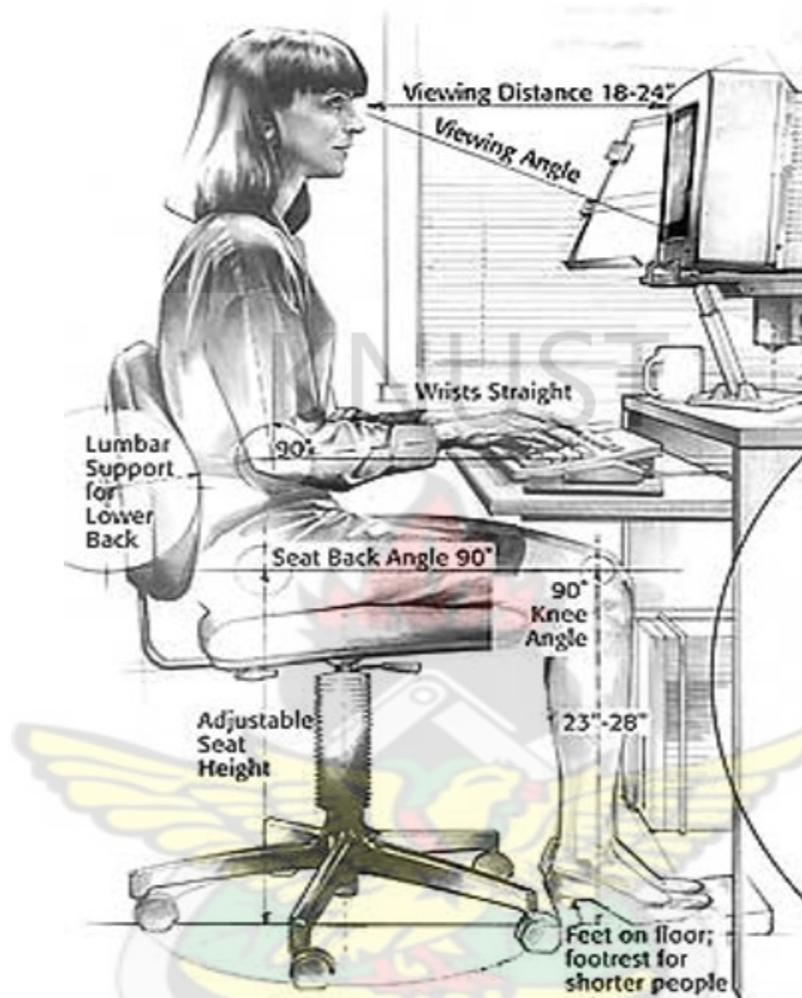
BNet Business Dictionary (2008) defines office as “a place in which business, clerical, or professional activities are conducted”. In simple term, it is often a building facility in which business activities take place. It ranges from temporary structures such as site offices to permanent multi-storey corporate edifices. Fundamentally, they all perform the function of supporting business activities. The office is a work system that entirely depends on humans: without them, no work gets done. Therefore, office ergonomics focuses on the human as the most important component of the office and adapts the office to the people involved. Such human-centered design requires knowledge of the characteristics of the people in the office, particularly of their dimensions, their capabilities, and their preferences (Kroemer and Kroemer, 2001).

The Office Ergonomics Handbook (2008) identifies the under-listed as the key ergonomic elements in the office;

- Your Chair and Workstation;
- Your Keyboard, Mouse and Monitor;
- Office Lights;
- Office Arrangement and Environmental Concerns;
- Indoor Air Quality and Thermal Comfort and;
- Noise Levels.

Figure 2.3 demonstrates the right human posture and fit in an office environment. The sitting posture, angles, distances and the arrangement of the chair, workstation, monitor, keyboard and mouse best support human function in the office and promotes employee health, safety and performance.

Figure 2.3 – Computer Workstation Variables



Source: (http://en.wikipedia.org/wiki/File:Computer_Workstation_Variables.jpg)

2.5.1 DIMENSIONS OF OFFICE ERGONOMICS

Moran (2010) suggests that because of the health risks posed by poor posture and repetitive stress, proper ergonomics are too important to ignore. In his article “*Home Office Ergonomics*”, Moran analyses how; the lack of ergonomic principles in the office can negatively affect some of the key human body parts i.e. the eyes, neck, wrist, arms, back, hips, legs, knees and feet.

Eyes and neck: Incorrect monitor positioning can cause neck and eye strain, and can lead to poor seat positioning, which creates pressure on the back. Costello, the ergonomics consultant, says the top of your monitor should be positioned just above your eye level when you're seated. This is the best place for your "vision cone," your most immediate field of vision, which starts at the top at your eye level and descends at a 30-degree angle.

When monitors are too far away, people tend to lean forward to see well. This is increasingly true as people age, since vision almost inevitably declines over time. A rule of thumb: If you can extend your arm and just touch the screen with your fingertips, then you're in the right position (Moran, 2010).

Wrists and arms: To keep wrists and arms at an optimum position, reducing the risk of repetitive-motion injuries, your keyboard and mouse should be at the same level as your elbows when you're seated. Since most desks are too high for this position, a simple fix is an adjustable keyboard tray that attaches to the underside of your desk, says Cynthia M. Burt of the Environmental Health and Safety Department at UCLA (Moran 2010).

Back and hips: Good news for aging disks: Sitting properly takes 20 percent to 30 percent of the pressure off your lower back. Your chair should be between 17 inches and 19 inches deep, and it should have good lower-back support. Your body should be positioned with your back against the chair and your hips open. If you find yourself leaning forward to see your monitor or reach the keyboard, move them toward you (Moran 2010).

Legs and knees: Leg positioning contributes to your overall position in the chair, says Burt, so be sure your legs are bent at about 90-degree angles at the knees. This helps alleviate pressure on the back. Burt warns that movement is essential for circulation, however, so allow for subtle shifts in positioning and be sure to stand, stretch and walk a few steps at least once an hour. Move about more frequently if you have diagnosed circulation problems (Moran 2010).

Feet: Feet should be firmly planted on the floor. If the chair positioning you require for proper wrist alignment results in your feet not reaching the floor, use a block, a few books or some other type of footrest to support your feet. However, make sure that the height of the support keeps your knees at a right angle, says Costello (Moran 2010).

2.6 THE CONCEPT OF EMPLOYEE PERFORMANCE

Every organization requires highly performing individuals in order to ensure competitive advantage and attainment of corporate goals. High employee performance is therefore one of the critical determinants of the level of organizational productivity and accomplishments. Accomplishing tasks and performing at a high level can be a source of satisfaction, with feelings of mastery and pride. In defining the concept of employee performance, Campbell et al., (1993) as cited in Sonnentag (2002) differentiates between an action (i.e. behavioural) aspect and an outcome aspect of performance. The behavioral aspect refers to what an individual does in the work situation. It encompasses behaviors such as assembling parts of a car engine, selling personal computers, teaching basic reading skills to elementary school children, or performing heart surgery.

The outcome aspect refers to the consequence or result of the individual's behavior. The above described behaviors may result in outcomes such as numbers of engines assembled, pupils' reading proficiency, sales figures, or number of successful heart operations. In simple terms, employee performance can be defined as the extent to which an organizational member contributes to achieving the goals of the organization.

2.6.1 FACTORS AFFECTING EMPLOYEE PERFORMANCE

Al-Anzi (2009) suggests that the key factors that affect employee productivity and performance fall into two categories:

- Management driven factors and;
- Factors that arise from premises, offices or factory design.

Management Driven Factors

Al-Anzi (2009) identifies the following as some of the management driven factors that tends to affect employee's productivity and performance:

- Organization plans such as the allocation of responsibilities at all levels of the organization, definition of job descriptions and the degree of access to the management and administrative support needed to complete their tasks;
- Working patterns, shift-working, break times, absence or holiday cover; and
- Health and safety policies, including the provision of training, development of safe working practices and the adequate supply of protective clothing and equipment.

Factors that arise from premises, offices or factory design

Al-Anzi (2009) proceeds to further identify the following as the key premises or office factors that tends to affect employee productivity and performance:

- Furniture
- Workspace availability
- Light intensity
- Weather/temperature
- Ventilation/humidity
- Noise/vibration
- Premises hygiene/welfare facilities

Similarly, Lelebici (2012) identifies two (2) major variables as affecting employee performance and productivity:

- Physical Components of the Environment; and
- Behavioural Component of the Environment.

Physical Components of the Environment

Lelebici explains that the physical component of the environment to include;

- Comfort Level: Ventilation, heating, natural lighting, artificial lighting, decor, cleanliness, overall comfort, physical security.
- Office Layout: Informal meeting areas, formal meeting areas, quiet areas, privacy, personal storage, general storage, work area – desk and circulation space.

Behavioural Components of the Environment

He explains the behavioural components of the environment to include:

- Level of Interaction and Distraction: Social interaction, work interaction, creative physical environment, overall atmosphere, position relative to colleagues, position relative to equipment, overall office layout and refreshments.

In another breath, Leblebici (2012) also identifies the under listed as some of the workplace factors affecting employee performance:

- Performance feedback;
- Role recognition;
- Defined processes;
- Workplace incentives;
- Supervisor support;
- Mentoring/coaching;
- Opportunity to apply;
- Job aids; and
- Goal-setting.

2.7 RELEVANCE OF WORKPLACE ERGONOMICS

The ultimate aim of workplace ergonomics is to generally ensure employee safety, enhance performance and productivity. Beyond these objectives, many other benefits are known to accrue to an organization when management commits to the development and maintenance of ergonomics in the workplace. “Practical Solution for a Safer Workplace (2002)” published by the Washington State Department for Labour and Industries observes that while

ergonomic improvements to the work environment are primarily used to create a safer and more healthful work environment, companies may experience other benefits, including:

- increased productivity
- increased work quality
- reduced turnover
- reduced absenteeism
- increased morale

From a safety perspective, Gyekye (2006) emphasizes that environmental conditions affect employee safety perceptions which impacts upon employee commitment. Similarly, extensive scientific research conducted by Roelofsen (2002) has also yielded indications suggesting that improving working environment results in a reduction in a number of complaints and absenteeism and an increase in productivity.

2.8 CONCEPTUAL FRAMEWORK

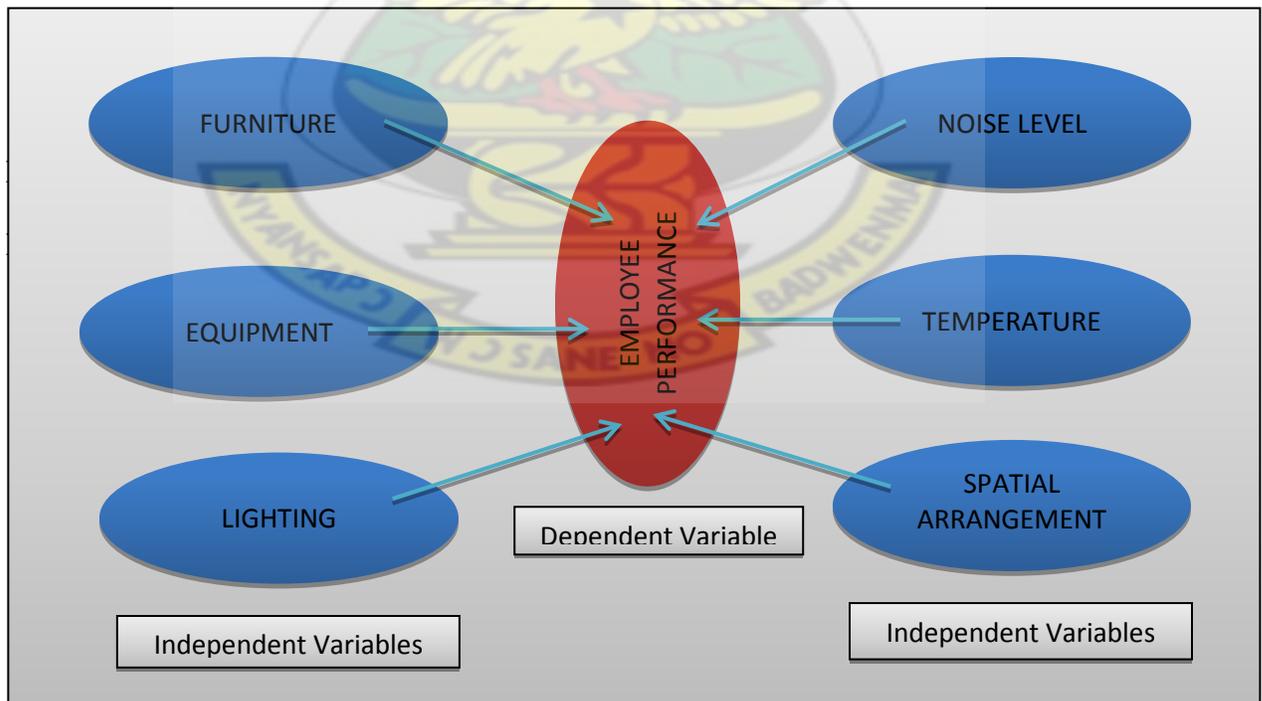
Following from the literature reviewed, the relationship between office ergonomics design and employee performance can be conceptualized and depicted in Figure 2.3. The conceptualized framework defines the set of workplace elements that are perceived to impacts on an employee performance. The elements such as furniture, noise level, temperature which are essentially independent variables impacting on employee performance, the dependent variable.

For instance, poorly designed furniture set out in an inefficient spatial arrangement and noisy environment will most likely increase employee stress and fatigue level, lead to back, neck and eye strains. These negative outcomes consequently lead to high rates of employee

incapacitations, absenteeism, low morale and interest. The gross result of these happenings is impairment of employee performance. It is significant to note that these elements have different impacts on different employees based on their objective assessment of the role the workplace environment has on their performance.

Emphasizing on the relationship that exist between an employees' workplace environment and his/her level of performance on the job, Al-Anzi (2009) posits that, how well employees engage with the organization, especially with their immediate environment, influences to a great extent their error rate, level of innovation and collaboration with other employees, absenteeism and, ultimately, how long they stay in the job. The model was formulated as a result of the researcher's perspective of how he perceives the problem at GNPC, and from insights gained from reading the literature.

Figure: 2.3. Conceptual Framework



Source: Author's own construct, 2012

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter considers the methodology of the research and describes the selection of the sample and the design of the survey instruments used to collect the data from the staff of GNPC operating from the Petroleum House in Tema. The principal aim of this chapter is to present the instruments used in the study and the statistical analysis undertaken in an effort to provide answers to the research questions and the general objectives of the research. The chapter also presents a profile of the Ghana National Petroleum Corporation, the case study for the research.

3.2 TYPE OF RESEARCH

This research adopts the case study approach by examining the office ergonomic situation of the Ghana National Petroleum Corporation's office in Tema. Yin (1984) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

The case study research design has been used by many researchers as it has proven to be a useful tool for investigating trends and specific situations in many scientific disciplines. The findings from the research will however be generalized for similar entities, particularly those in the Oil and Gas Industry.

3.3 SOURCES OF DATA

There are two principal types of data: primary and secondary data. Data for the study were obtained from both primary and secondary sources. Primary data was obtained directly from employees and management of the Ghana National Petroleum Corporation through mainly the administration of questionnaires during the fieldwork. Secondary data was also obtained from reports and other documents from the Corporation, as well as from journals, books, and from the internet, among others. Literature obtained from secondary sources regarding workplace environment and performance was reviewed to identify workplace environment and strategies that adequately support the realization of corporate objectives.

The various workspace types such as enclosed cubicles with partition walls, cellular offices with floor-to-ceiling walls, and desks, chairs, computers and other office equipment located in the various offices was studied with the aim of gathering information on how they impact on employee performance.

3.4 TARGET POPULATION

Kitchenham (2002) defines target population as the group or the individuals to whom the survey applies. In other words, you seek those group or individuals who are in a position to answer the questions and to whom results of the survey apply. The target population for this study was the entire staff and management of the Ghana National Petroleum Corporation specifically operating from the Head Office Building in Community 1, Tema. As far as this work is concerned therefore, customers and other service providers such as bankers were not interviewed. Also out of the sampling frame are security officials and casual workers.

3.5 SAMPLING

A total of 88 staff were drawn from the various functional departments and units at GNPC for the survey. In addition, 10 heads of identifiable Units and Managers were also interviewed for more in-depth information on the subject. This gives an overall sample size of 98 respondents. The 88 respondents were chosen by the simple random sampling procedure, which gives everyone an equal chance of being selected. Kitchenham (2002) defines simple random sampling as a method of sampling in which every member of the target population has the same probability of being included in the sample. This form of sampling tends to eliminate subjectivity and obtains a sample that is both unbiased and representative of the target population. This method also facilitated the generalization of the findings from the study. The Unit Heads and Managers were however selected by purposive sampling.

3.6 DATA COLLECTION

The main tool for data collection was the questionnaire. A questionnaire is a formalized set of questions for obtaining information from respondents that translate the researcher's information needs into a set of specific questions that respondents are willing and able to answer. The selected respondents were contacted and informed of the project and what it seeks to achieve. The respondents were all well-educated and could read and understand the questionnaires with little guidance. To ensure uniformity, the questions were mostly close ended, although there were few instances for open ended questions, in order to give them the chance to express themselves freely. In addition to the questionnaire, direct observations of office ergonomic situation were done in randomly selected offices. The views and opinions

of 10 heads of identifiable Units and Managers on the subject were acquired through an unstructured interview. Punch (1998) explains an unstructured interview as a way to understand the complex behaviour of people without imposing any a prior categorization which might limit the field of inquiry. The flexibility of this approach afforded the opportunity to gain in-depth information regarding management's perspectives on the subject.

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3.7 DATA ANALYSIS

The data obtained from the questionnaire was validated through vetting for consistency and completeness. Subsequently, the responses were partitioned into homogeneous sub-groups to facilitate analysis. The data was analyzed quantitatively using the Statistical Package for the Social Sciences (SPSS) and Microsoft Excel, and results presented through graphs, pie charts, and tables. Pictures of unique offices to show office arrangement, seating arrangement, furniture etc., were also taken for good visual effect.

3.8 OVERVIEW OF THE GHANA NATIONAL PETROLEUM CORPORATION

The Ghana National Petroleum Corporation (GNPC) was established in 1983 with a vision to become a world class company that partners with the international petroleum industry to enable Ghana find and develop oil and gas resources for the benefit of the people of Ghana as well as our partners who share in the exciting expedition.

Prior to the establishment of the Corporation, the Petroleum Department under the then Ministry of Fuel and Power carried out the procurement of crude oil and petroleum products. The Technical Directorate of the Ministry of Fuel and Power and the Geological Survey

Department coordinated petroleum exploration activity and received reports on operations. GNPC was established to support the Government's objective of providing adequate and reliable supply of petroleum products and reducing the country's dependence on crude oil imports through the development of the country's own petroleum resources.

In addition to the functions of coordinating petroleum exploration activity, the Corporation took over the assets, liabilities, and functions of the then Petroleum Department and assumed responsibility for the importation of crude oil and petroleum products to meet national demand.

GNPC has since established a comprehensive database on the enormous potential of the various sedimentary basins in Ghana. The Corporation identified some of the prospects that led to recent exploration successes in Ghana's deep-water areas, enabling the country to become a deep-water oil producer and net exporter within three and half years after the Jubilee discovery.

GNPC's ambition is to become a leading global oil and gas company whose operations have a profound impact on the quality of life of the people of Ghana.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the analysis of the results of the fieldwork and discussion of the findings of the study. It examines the design and furnishing of the Petroleum House and its resultant effect on the performance of the GNPC employees. It then seeks to establish a link between workplace environment and employee's performance at the GNPC. The study's overriding concern is that the quality and functionality of a workplace environment wields a considerable influence on the level of employee productivity and overall performance.

4.2 DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

A total of 100 questionnaires were administered to staff of GNPC who operate from the Petroleum House. Out of this, 88 questionnaires representing 88 percent were completed and returned. Over 80 percent of the respondents were less than 50 years old indicating the youthful nature of GNPC employees at the Petroleum House. Indeed 76.1 percent of the total respondents were males while 23.9 percent were females.

The respondents who were drawn spanned the various job levels with the majority of the respondents being junior and middle level staff, accounting for 92.0 percent of the total respondents. Senior management accounted for only 8 percent of the respondents.

The respondents were drawn from the various divisions, departments and units at GNPC to ensure adequate and fair representation of views of employees on the subject. Those from the

Administration Division were however in the majority accounting for 17.5 percent of the total, followed by the Finance Division with 14.77 percent of the total. Besides the respondents of the questionnaires, the views of 10 senior managers on the subject were elicited through an unstructured interviewed and incorporated in the study.

4.3 OFFICE DESIGN, FINISHES AND FURNISHING AT GNPC PETROLEUM HOUSE

As far back as the 1980s, GNPC was operating from the Black Star Line building at Kuku Hill in Osu, Accra. GNPC moved into the then newly built Petroleum House in Community one, Tema in September 1989. According to the Chief Facilities Officer, GNPC initially moved into the Petroleum House as tenants but eventually purchased the property from the Social Security and National Insurance Trust (SSNIT) in 1991.

The Petroleum House is an eight-storey purposed built office facility which was originally let to GNPC as an open plan facility. GNPC subsequently designed the open spaces on each floor into cellular offices using polished plywood panels as the main partitioning material. The total floor area of the office complex which measures 4,789.24 square metres according to the Chief Facilities Officer was redesigned into individual cellular offices with an average floor area of 20 square metres. Surprisingly, most of the plywood partitions have remained in use for the past 23 years (since their construction in 1989). Although the layout of the Petroleum House is predominantly cellular offices, it was observed during the study that a few of the partitioned offices had been opened up to create open plan offices, ostensibly to

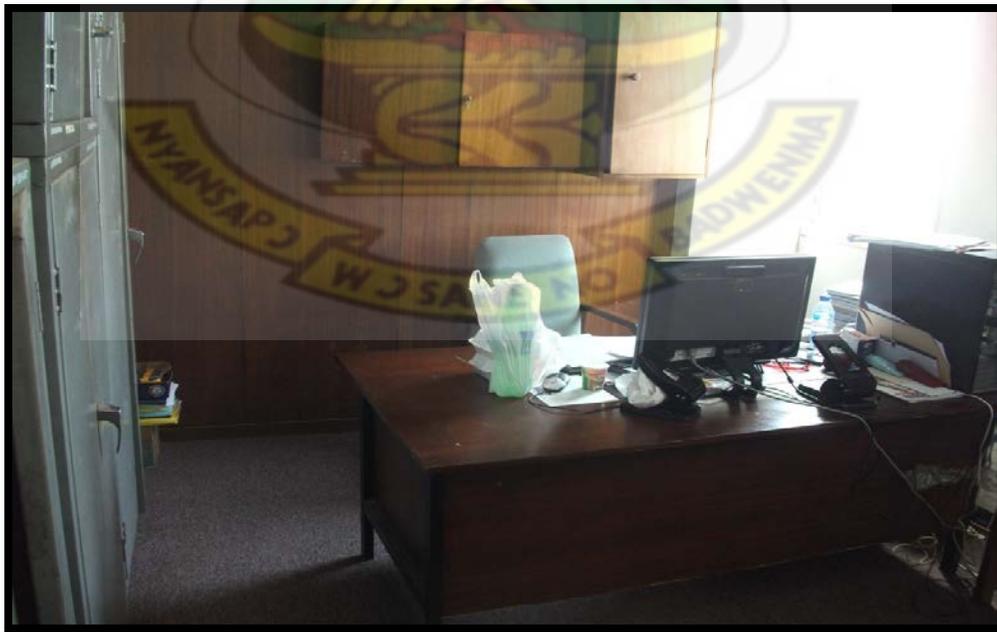
ensure efficiency in space utilization and enhance collaboration among teams. Plate 4.1 is an example of some of the open plan offices that were identified during the study.

Plate 4.1: An open plan office accommodating 8 employees at GNPC



Source: Field Survey, June 2012

Plate 4.2: A cellular office accommodating one staff at GNPC



Source: Field Survey, June 2012

Similarly, Plate 4.2 displays a typical cellular office at the Petroleum House showing some of the 23 year old polished plywood partition behind the chair.

All senior managers at GNPC have been allocated cellular offices. However, the rest of the job levels are made to share offices, with the number of occupants per office increasing as one goes down the job levels. On the average, between 2 to 4 employees were observed to be sharing one cellular office.

The state and décor of most of the offices were observed to be unimpressive apparently due to the outdated plywood partitions which have over the years grown darker in colour creating a dull and uninspiring working environment. The situation raises serious ergonomic concerns regarding inadequate lighting of offices and uninspiring walls which have the tendency to stress employees and affect their health and overall performance.

The study also observed that most of the offices at the Petroleum House have been fitted with window unit air-conditioners that often created some noise in the offices. Also, nearly all employees have been provided with furniture, however, considerable number of the furniture was found to be outdated, less functional or inappropriate for the users. For instance some employees were found using un-adjustable chairs which could not be accustomed to fit the employee or the assigned task raising serious health concerns. The Manager in charge of the Geology Department at GNPC during his interview session expressed concerns over the continuous use of old and less functional furniture within his Department. He indicated that

his earlier request to the Administration Division for some old furniture to be replaced in his secretariat was yet to be met.

Indeed, it was observed that the finishes at the Petroleum House had seen some improvements over the years. The few improvements that were identified included tiling of some of the hitherto terrazzo floors, replacement of selected plywood partitions with formica material fixed in aluminium profiles and the replacement of the building's disused passenger lifts which were effected in 2011. These improvements were confirmed by the Chief Facilities Officer. Similarly, at the time of the study, GNPC had taken delivery of a new 700 kVA standby generator as a replacement for the existing 500 kVA generator which had been in use since the year 2005 and had become unreliable.

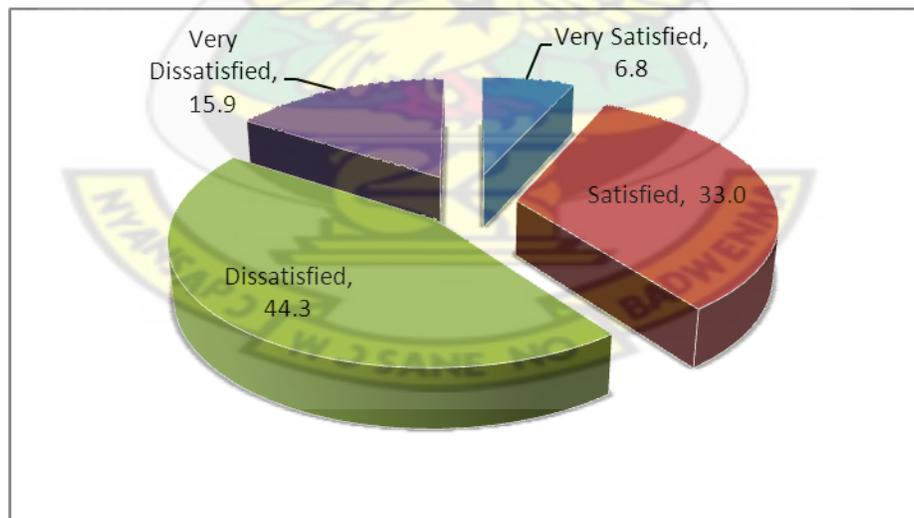
4.4 ERGONOMIC FEATURES IN THE DESIGN, FINISHES AND FURNISHING OF THE WORKPLACE

The study identified considerable ergonomic lapses in various offices at the Petroleum House. Generally, the lapses bothered mainly on poor office décor/finishes, inadequate office illumination, appreciable office noise levels, uncomfortable room temperature and in certain cases un-ergonomic office furniture. The views expressed by the respondents on the various ergonomic elements as presented on Figures 4.2, 4.3 and 4.4 confirm some of the ergonomic challenges identified in offices at the Petroleum House.

4.4.1 OFFICE DESIGN AND DÉCOR

GNPC's workplace environment is generally defined by cellular offices created with polished plywood partitions. From ergonomics perspective, the plywood partitions give the offices a dull monotonous and uninspiring ambiance. The study revealed that a total of 60.2 percent of the employees surveyed are not satisfied with the office design and décor at the Petroleum House. Respondents who are dissatisfied with the office design and décor alluded to the dark partitioning walls, seemingly noisy window air-conditions and inadequate lighting. Fig. 4.1 gives an overview of the respondents' level of satisfaction with the office design and décor at the Petroleum House. The Chief Facilities Officer and the Principal Human Resources Officer expressed similar sentiments and hinted that the Corporation was considering moving out of the Petroleum House in the near future.

Fig. 4.1: Respondents' Satisfaction with Office Design and Décor



Source: Field Survey, June 2012

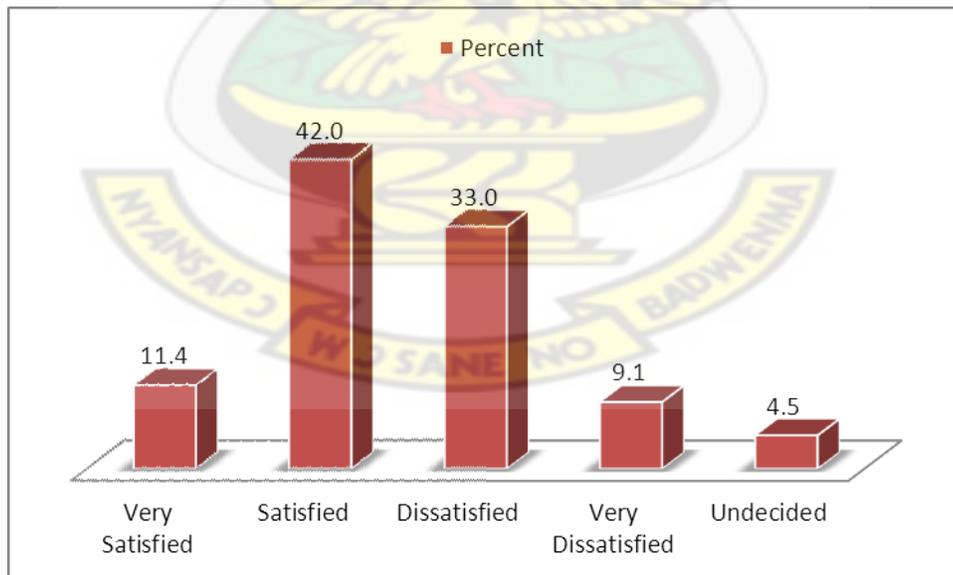
Only 6.8 percent of the total respondents were very satisfied with their office design and décor, while 33.0 percent were satisfied. As much as 44.3 percent indicated they were

dissatisfied while 15.9 percent were very dissatisfied. As already indicated, some of the offices at the Petroleum House have over the years been given facelift in the form of floor tiling, replacement of old plywood partition and introduction of window blinds. The respondents who indicated their satisfaction with their office design and décor are most likely to be occupants of such improved offices.

4.4.2 OFFICE FURNITURE

In terms of the functionality and ergonomics of the office furniture, the study revealed as presented in Fig. 4.2 that, although 53.4 percent of the respondents are satisfied with their office furniture, as much as 42.1 percent are dissatisfied with their office furniture as they found them not suited enough for their comfort and work.

Figure 4.2: Employees' satisfaction with office furniture

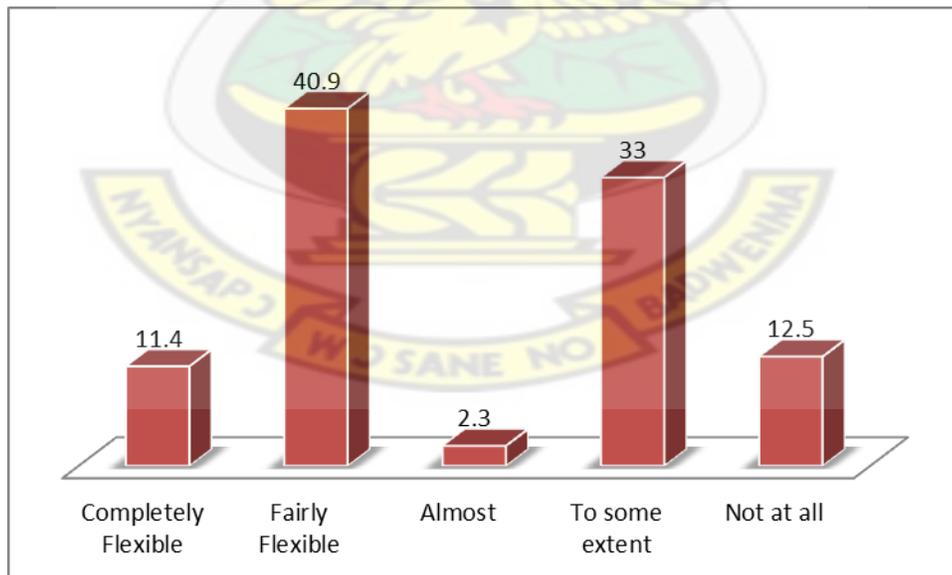


Source: Field Survey, June 2012

This level of dissatisfaction with office furniture gives cause for concern as furniture is one major source of back and neck related injuries which has the tendency to affect the health and performance of the employee. Perhaps conscious of the negative impact of un-ergonomic furniture on its employees, GNPC over the years has progressively been replacing the outdated furniture with new ones. For instance, in the year 2012, GNPC procured 181 pieces of assorted office furniture to replace outdated ones.

Specifically with regard to the comfortability and flexibility of their furniture, although the larger majority indicated that they found their furniture to be comfortable, as much as 33 percent only partly agreed while 12.5 percent did not agree at all that their furniture were flexible to adjust, rearrange to offer support, comfort and functionality (Fig 4.3).

Fig. 4.3: Response on level of Comfort and flexibility of office furniture



Source: Field Survey, June 2012

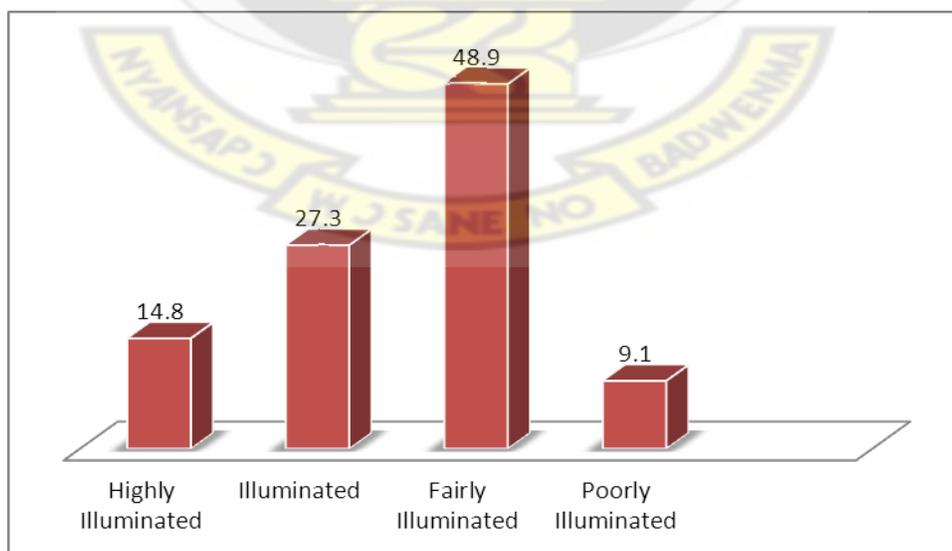
Obviously, GNPC's effort to replace old furniture does not appear to have been effective as evidently, appreciable number of the old furniture (most of which were procured over 20 years ago) are still in use at the Petroleum House. In an interview with the managers in charge of the Geology and Geophysics Departments, they recounted that their earlier requests to the Administration Division for some old furniture to be replaced in their respective departments were yet to be met.

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4.4.3 OFFICE ILLUMINATION

Office illumination is one of the key elements of office ergonomics. This is because it impacts on the visual comfort and capabilities of employees. The study therefore sought respondents' views on their office illumination levels. Although 27.3 percent described their offices as illuminated, nearly half of them (48.9 percent) described their offices as only fairly illuminated while 9.1 percent thought their offices were poorly illuminated (Fig. 4.4).

Fig 4.4: Response on Office Illumination Levels



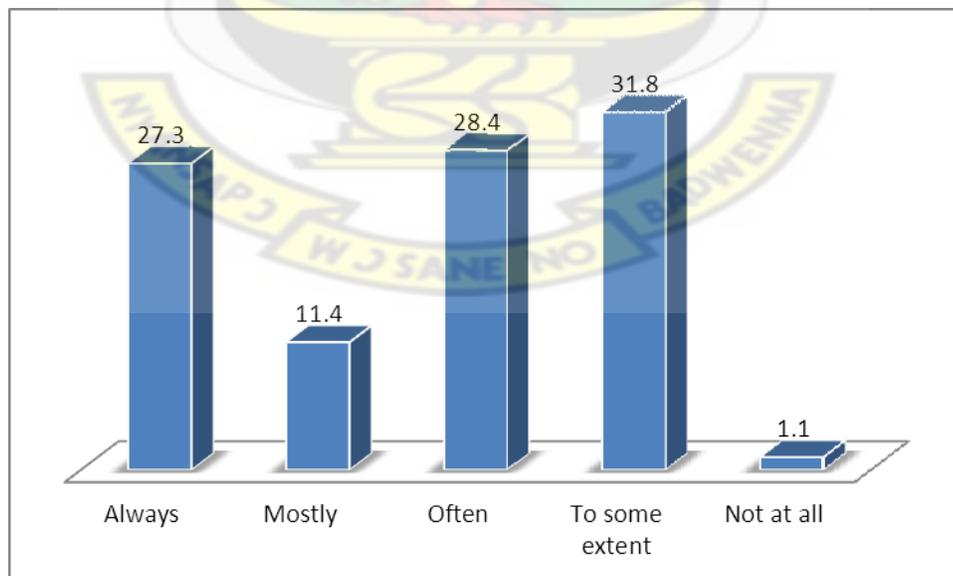
Source: Field Survey, June 2012

The study observed that a lot of the offices at the Petroleum House did not appear to be adequately illuminated ostensibly due to dark looking plywood partition walls that weaken the illuminative intensity of the compact fluorescent lights installed in the offices.

4.4.4 NOISE LEVEL

Noise level is one of the ergonomic elements that impacts on employee communication and cognitive activities. Responses were obtained on the noise levels at the Petroleum House. As shown in Fig. 4.5, a total of 27.3 percent of the respondents indicated that their offices are always quiet for productive work, while 31.8 percent indicated that their offices are quiet to some extent, but not so all the time. Respondents complained of the window unit air-conditioners as the main contributing factor to the noise at various offices. On the whole, the results seem to suggest that respondents do not have much of a problem with office noise levels as they might with other variables.

Fig. 4.5: Response on Office Quietness Levels

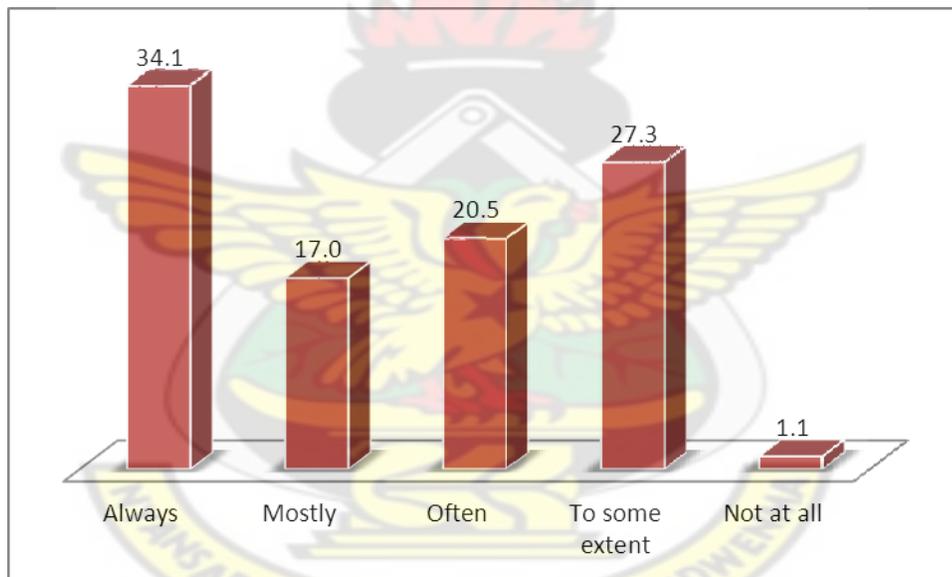


Source: Field Survey, June 2012

4.4.5 ROOM TEMPERATURE

The study considered room temperature as one of the key elements of office ergonomics. It was observed that nearly all the offices at the Petroleum House have been fitted with window unit air-conditioners to afford employees a comfortable working environment. As seen in Fig. 4.6, only 1.1 percent of the respondents found their office room temperature to be not conducive at all, and like office illumination, it seems this is also an area that respondents don't have issues with.

Fig. 4.6: Response on Conduciveness of Office Room Temperature



Source: Field Survey, June 2012

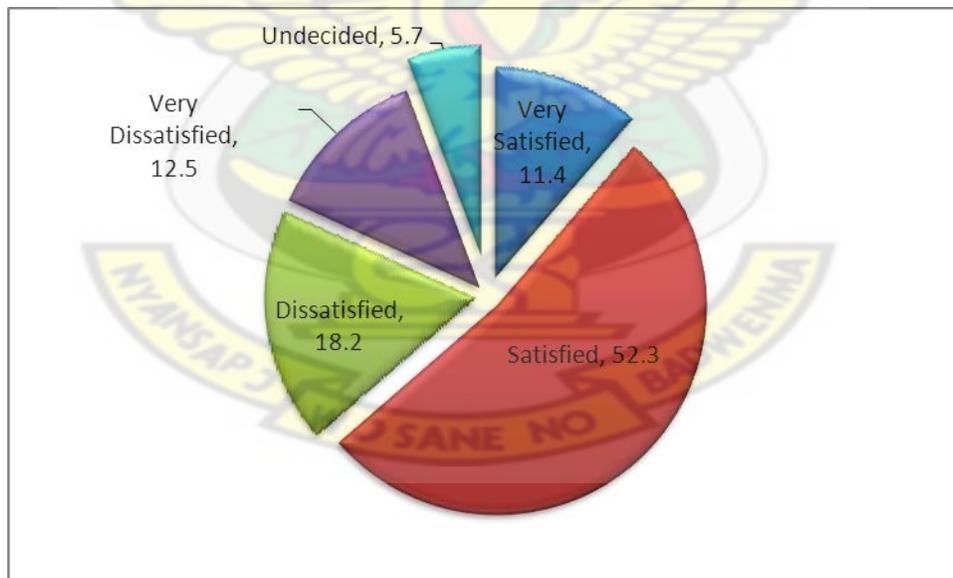
Regardless of the appreciable ergonomic lapses prevalent at the Petroleum House, it is worthy to note that few positive ergonomic features were identified in the areas of office space allocation and equipment. The study observed that the office layout at the Petroleum House provide employees with ample room and space to conduct their work activities. It is

therefore not surprising that as much as 71.6 percent of the respondents are satisfied with their office spaces.

4.4.6 OFFICE EQUIPMENT

Office equipment such as computers, printers, photocopiers, plotters among others have increasingly become the basic job tools for enhanced performance in the corporate world. Evidently nearly all employees at the Petroleum House have been provided with computers and other complementary office equipment to facilitate their work. Nevertheless, Fig. 4.7 shows that 18.2 percent and 11.4 percent respectively are dissatisfied and very dissatisfied with their office equipment.

Fig. 4.7: Employees' satisfaction with office equipment



Source: Field Survey, June 2012

4.4.7 WORKPLACE HEALTH AND SAFETY

Workplace safety is an integral part of office ergonomics. The study therefore required respondents to make an assessment of their workplace safety and security. A total of 51 respondents representing 58 percent indicated that their offices were safe and secured. However, 37 respondents representing 42 percent did not feel that their offices were safe and secured enough. Table 4.1 shows the responses on how safe and secure respondents feel about their offices.

Table 4.1: Responses on safety and security of offices

	Frequency	Percent	Cumulative Percent
Yes	51	58.0	58.0
No	37	42.0	100.0
Total	88	100.0	

Source: Field Survey, June 2012

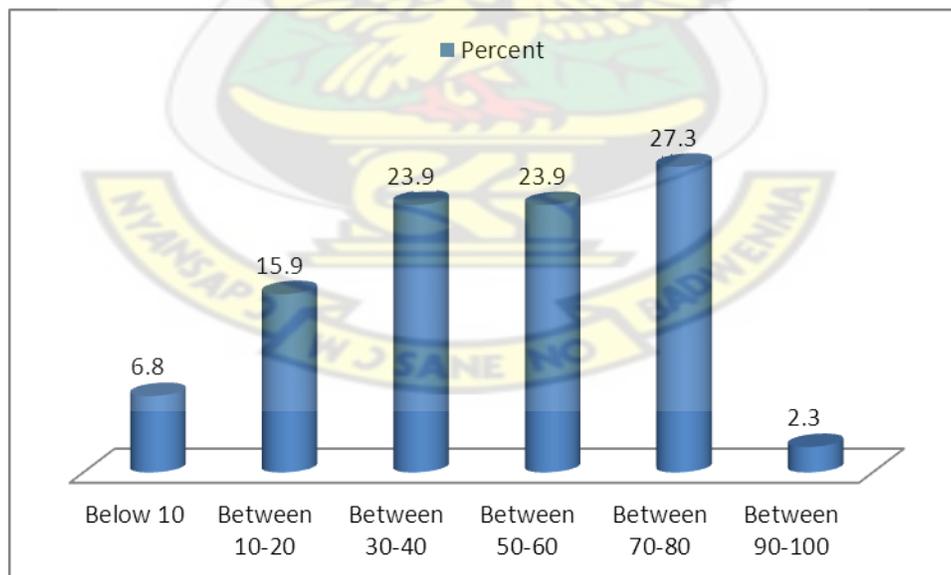
Observation of the Petroleum House building revealed that basic safety and security measures and installations such as emergency fire exits, fire extinguishers, emergency directional signs and guard security have been provided. However, isolated cases of poor cable management and stockpile of papers which pose safety and fire hazards respectively were identified. The responses shown in Table 4.1 above may have been informed by these considerations.

4.5 IMPACT OF OFFICE ERGONOMICS ON PERFORMANCE OF GNPC EMPLOYEES

The study sought to find out whether GNPC’s workplace environment has any impact on the performance of its employees. What seems to emerge is that although nearly all the respondents conceded that workplace elements such as office space, room temperature and lighting, furniture and equipment etc. have one way or the other affected their performance, the extent of the impact varied from one employee to the other.

Fig. 4.8 shows that 27.3 percent of the total respondents indicated that their office designs and décor impacted negatively on their job performance by between 70-80 percent. Cumulatively 63.6 percent of the total respondents were of the opinion that the effect of office design and décor on their job performance range from 10 – 60 percent.

Fig. 4.8 Respondent view on the extent of office design and décor on their performance



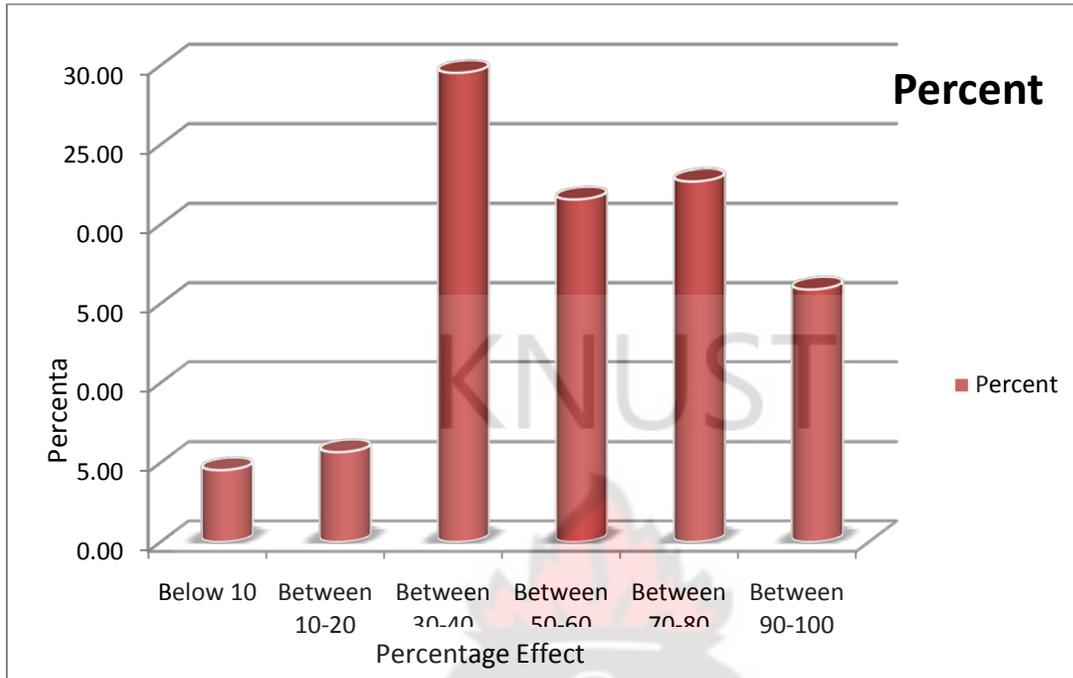
Source: Field Survey, June 2012

In their opinion, the cellular offices limit the needed team collaboration and communication. They also argue that the design and the décor was uninspiring, sometimes stressful and in some cases demoralizing thereby affecting their level of productivity. Regardless, 6.8 percent of them were of the opinion that the negative effect of their office design and décor on their performance was really less than 10 percent. The need for an open collaborative work environment was reiterated by the managers in charge of Information Systems, Data Management & Communication, Finance, Engineering and Marketing Departments.

Most of GNPC's transactions with foreign investors and other business stakeholders and technical review meeting often take place in the Petroleum House and as remarked by the Manager in charge of the Geology Department "*the current state and décor of the Petroleum House sometimes indirectly limits our capacity to negotiate hard on certain international deals*".

Considering GNPC's workplace ergonomic elements and their impact on employee's performance, the study again revealed that workplace elements (such as office furniture, equipment, room temperature, air quality, noise levels and quality of office lighting) negatively affect employees' performance at varying degrees.

Fig. 4.9 Respondent view on the extent of office furniture on their performance



Source: Field Survey, June 2012

Fig. 4.9 gives an over view of the negative effect of office furniture on the performance of the respondents. Twenty six respondents representing 29.5 percent of the total indicated that their office furniture negatively impacted on their performance by between 30 – 40 percent. Similarly, other respondents as shown in Fig. 4.9 expressed their concerns at varying degrees (ranging from 10-100 percent) on the effect office furniture has on their performance.

With respect to office environment, 33 percent of the respondents felt that this had impacted negatively on their health, while 15 percent actually confirmed having suffered an injury or illness due to the nature of their office environments.

Some of the respondents complained that sometimes they are unable to sit through for the day's work because their furniture causes them backaches and neck strains. Some also confirmed that there had been occasions where they had to stay out of the office for a couple of days due to excruciating back pain which they attributed to their un-ergonomically designed chairs.

The study sought the opinion of GNPC employees at the Petroleum House on the effect their office equipment has on their performance. As shown on Figure 4.10, majority of the respondents indicated that their office equipment affects their performance considerably. Indeed, 36 respondents representing 40.9 percent of the total respondents rated the positive impact of office equipment on their performance at between 70-80 percent. Similarly, other respondents expressed at varying degrees (ranging from 30-100 percent) the positive effect office equipment has on their performance at the Petroleum House.

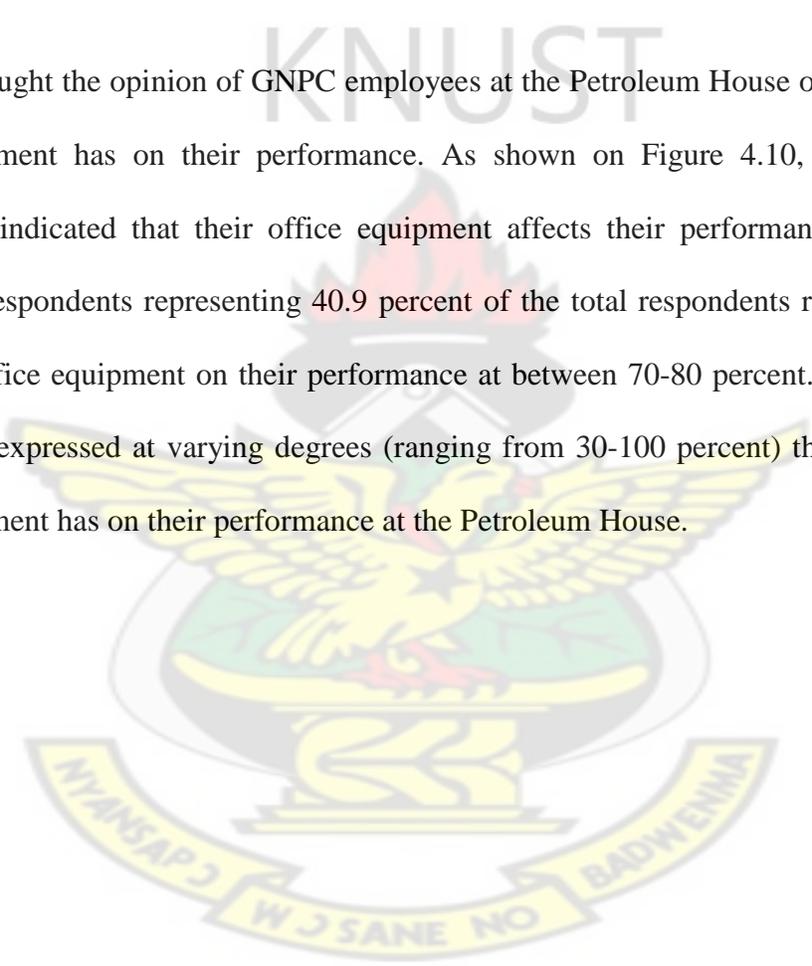
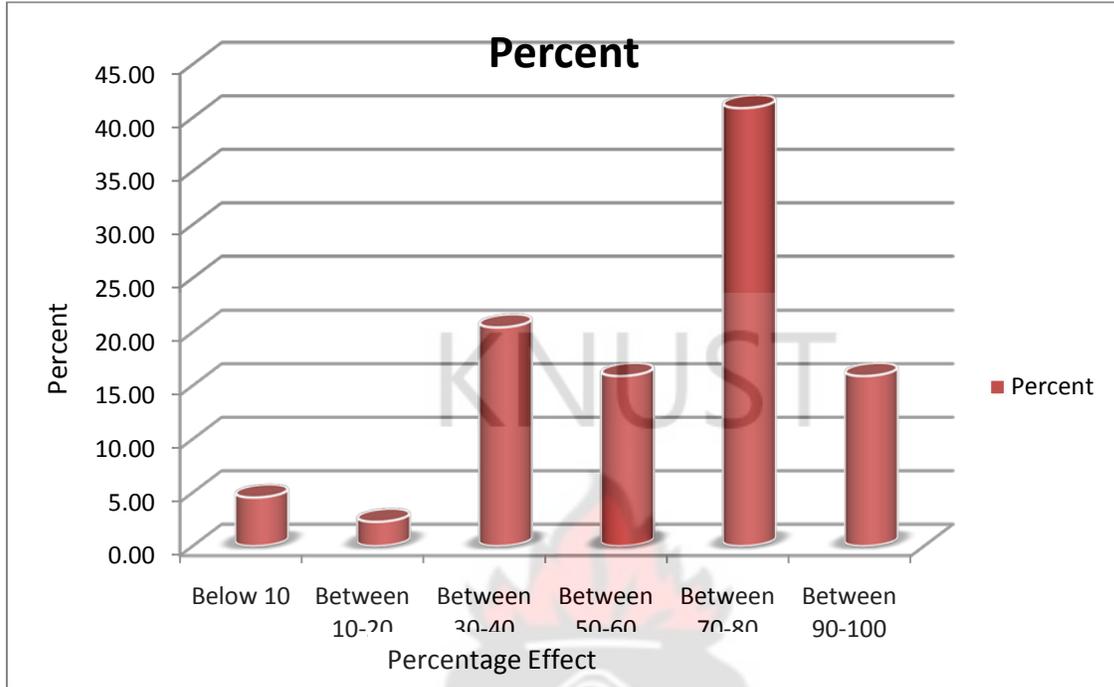


Fig. 4.10 Respondent view on the extent of office equipment on their performance



Source: Field Survey, June 2012

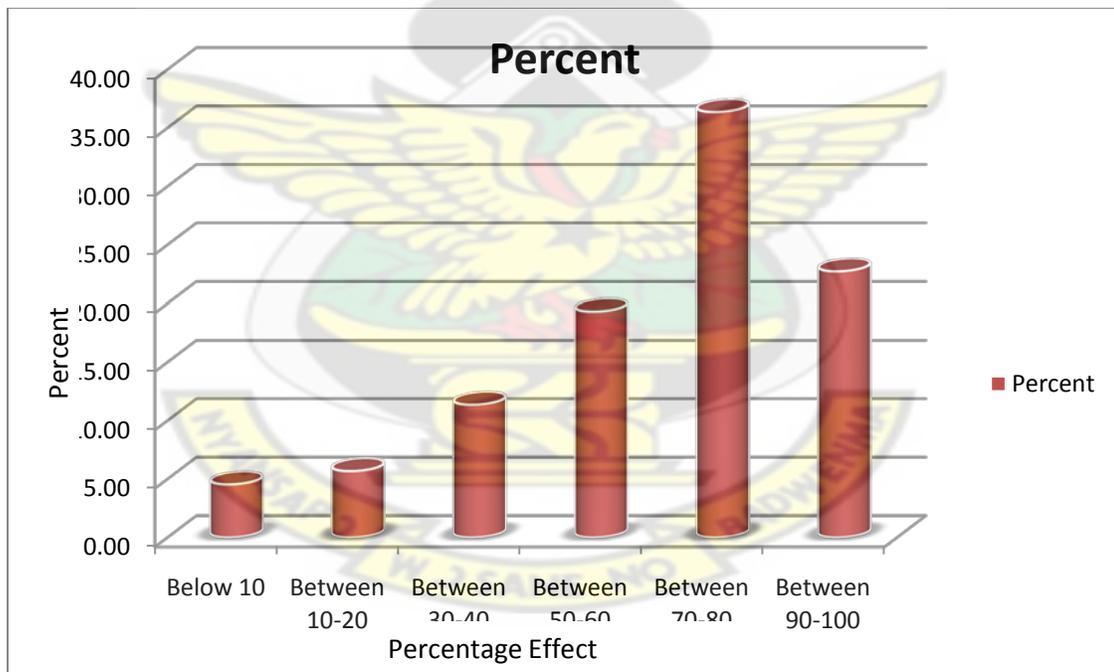
Nearly all employees at the Petroleum House have been provided with computers to facilitate their work. GNPC employees at the Geology, Geophysics and Engineering Departments (GNPC's technical departments) mostly use Geo-workstations (advanced computers) for their daily operations. Plotters and large format printers have also been provided to aid GNPC's operations at the Petroleum House.

The views expressed by the respondents show that their office equipment offers them the right support for their job delivery and performance. According to some of them, the geo-workstations help them in their geological and geophysical surveys and analysis thereby enhancing their performance and productivity.

Room temperature and quality of lighting are some of the key elements of office ergonomics that impact on overall performance of employees. Prolonged exposure to a seemingly dark and hot office environment is likely to contribute to visual and stress related problems among occupants.

Fig. 4.11 and 4.12 show the extent to which room temperature and office lighting affect the performance of employees at the Petroleum House. In both cases, over 35 percent of the total respondents concluded that both room temperature and lighting impacted negatively on their performance by between 70-80 percent.

Figure 4.11 Respondent view on the extent of Room Temperature on their performance



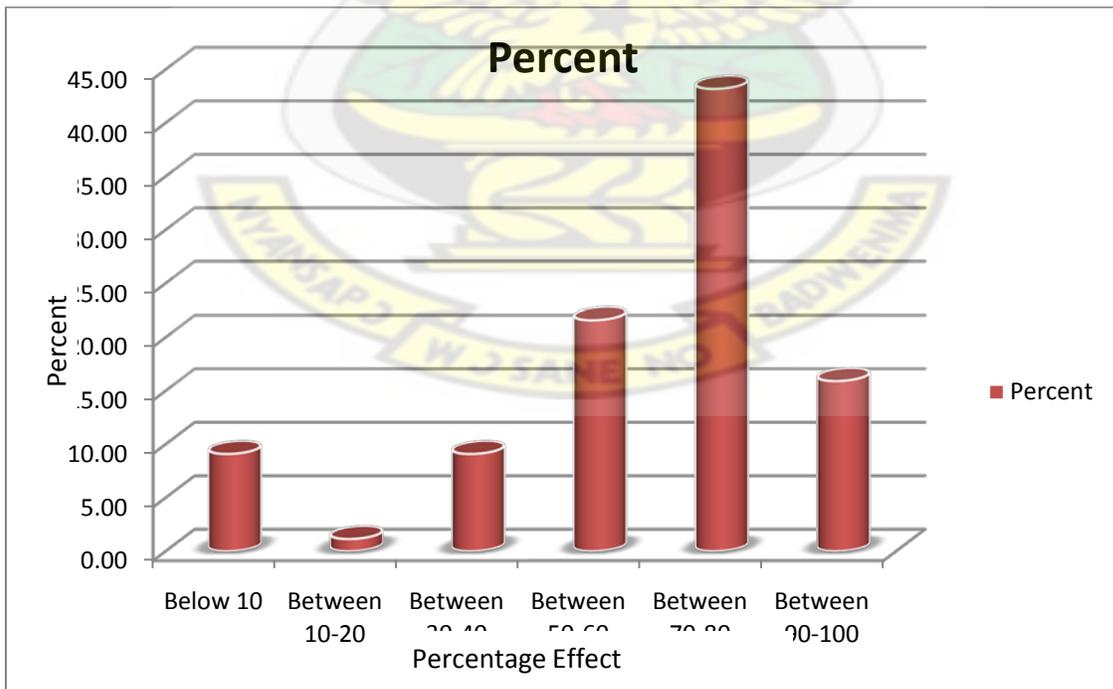
Source: Field Survey, June 2012

Some of the respondents alluded to the frequent breakdown of air-conditioners which renders the offices unbearably hot and stressful for productive work. Some also mentioned that the

not-so-well-lit office environments sometimes prove to be disincentive to performance as it renders the office gloomy and stressful. The responses obtained on the effect of office lighting on the performance of the GNPC employees surveyed underscored the need for adequate lighting in the offices.

Similarly, nearly 45 percent of the total respondents expressed concerns on the quality of lighting in their offices which they claim exerted considerable negative effect ranging from 70-80 percent on their performance. Although offices at GNPC have been fitted with compact fluorescent bulbs, the rooms appear to be poorly illuminated due to the dark looking partitioning walls. As a result, a number of the employees see their offices as poorly illuminated and wish for brighter offices. Again they pointed to the fact that the offices are least exciting and barely encourage one to want to spend considerable hours within them.

Fig. 4.12 Respondent view on the extent of quality of lighting on their performance



Source: Field Survey, June 2012

4.6 ERGONOMICALLY BASED INTERVENTIONS TO ADDRESS EMPLOYEE HEALTH, COMFORT, WELLBEING AND PERFORMANCE

The workplace environment is one of the critical factors that drive employee performance. Asked whether their current offices will require improvement, a whopping 98.9 percent of the total respondents responded in the affirmative.

Analysis of the responses in favour of workplace improvement revealed that 43.7 percent of the respondents expressed their desire for modern and brighter office partitions fitted with window blinds and other related decorative pieces. Similarly, the interventions requested by 18.2 percent of the respondent related to the installation less noisy but efficient air-conditioners that will guarantee stable and comfortable room temperature.

The need to deploy highly ergonomic furniture at the Petroleum House was also suggested by 27.3 percent of the total respondents as a measure to curb the health hazards posed by some of the old and un-adjustable furniture currently in use at the Petroleum House.

As part of the required office improvements, 5 percent of the total respondents want to see ICT related interventions such as replacement or provision of new computers as well as proper management of ICT cables to avoid the present situation where ICT cables have been laid across offices in some cases posing safety hazard.

Generally, the spectrum of ergonomic interventions requested by the respondents is a clear indication of the extent to which GNPC employees are dissatisfied with their current workplace environment and further echoes the extreme desire for improvement to help

address employee health, comfort, wellbeing and overall performance. The Director of Operations who also acts as the Acting Director of Administration spoke of his dream to see GNPC operate from a facility that compares well with National Oil Companies in the advanced world and confirmed that plans were already underway to realize this dream.

4.7 DISCUSSIONS OF FINDINGS

The finding from the study to a considerable extent validates and brings to reality the widely accepted assumption presented in Leblebici (2012) that a better workplace environment motivates employees and produces better results.

The study demonstrated that office ergonomics deficiencies at the Petroleum House which includes outdated office design and décor, inadequate office illumination, un-ergonomic office furniture, unsuitable office design and décor have variedly impaired the performance of an average GNPC employee by between 20 to 80 percent.

According to Beautyman (2006), businesses that ignore the design and layout of their workplaces are failing to optimize the full value of their human capital. The findings from the study confirm Beautyman's assertion in view of the fact that the office design and décor of the Petroleum House has impaired the performance of the average GNPC employee by between 20 to 80 percent. Selected senior managers interviewed were also of the opinion that GNPC's current workplace environment does not seem to enhance employee performance.

“Practical Solution for a Safer Workplace (2002)” published by the Washington State Department for Labour and Industries observes that ergonomic improvements to the work environment primarily lead to a safer and more healthful work environment. The lack of ergonomic improvements is known to predispose employees to safety and health hazards.

According to the Health and Safety Executive (HSE), 2007, failure to observe ergonomic principles may have serious repercussions, not only for individuals, but the whole organization. Many well-known work related accidents might have been prevented if ergonomics had been considered in designing the jobs people did and the systems within which they worked.

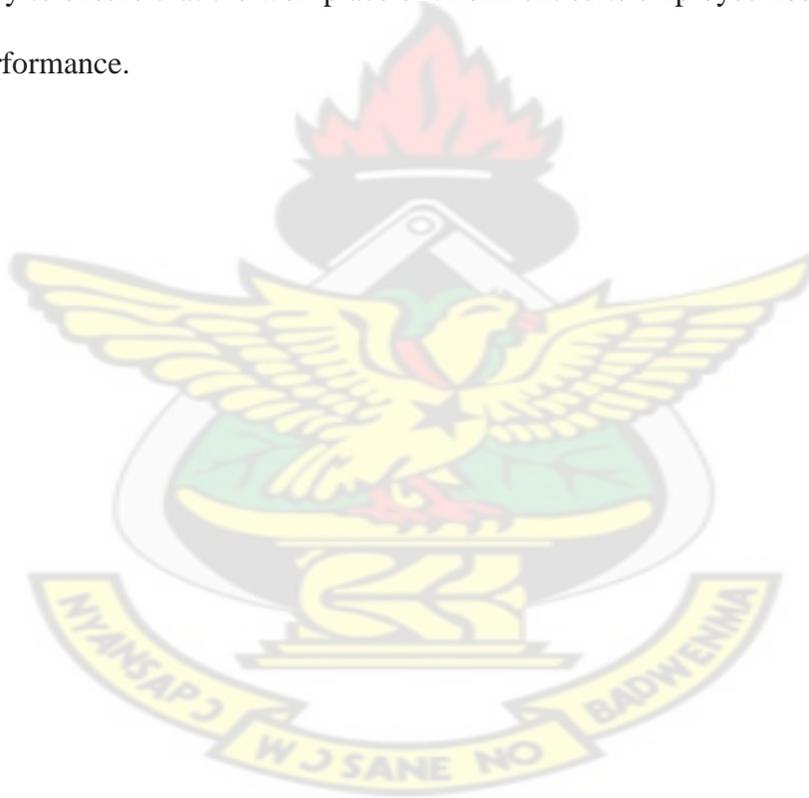
It emerged from the study however, that 33.0 percent of the respondents felt that their office environment had impacted negatively on their health, while 15.0 percent actually confirmed having suffered an injury or illness due to the nature of their office environments. These results uphold the assertion made by the HSE that some of these injuries that reduces employee performance may have been prevented if adequate ergonomic interventions were in existence at the Petroleum House.

Increasingly, open plan offices are replacing hitherto cellular office layouts due to the latter’s restrictions on employee collaboration and communication, monotonous and less inspiring attributes and overall inefficient utilization of office space.

Hamilton et al. (1996) recounts how the hitherto inefficient cellular office layout of the 31-storey Alcoa Building in Pittsburgh, Pennsylvania characterized by 12-feet by 15-feet offices

has now been transformed into a modern office layout made up of executive suites of open cubicles and areas for impromptu meetings: “*the communication centre,*” featuring televisions, fax machines, newspapers and tables to encourage team/group meetings.

The findings from the study show that the current office layout at the Petroleum House typifies Alcoa Building’s outdated and inefficient cellular office design prior to its modernization. The Alcoa Building’s experience underscores the need to design office ergonomically to ensure that the workplace environment suits employee needs, functions and enhances performance.



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the summary of findings, conclusions and recommendations that emerged from the study. It summarizes the key ergonomic deficiencies identified in the design and furnishing of the Petroleum House and the negative impact such deficiencies have had on the performance of GNPC employees. It presents the final conclusion of the study and goes on to suggest practical recommendations aimed at incorporating high levels of office ergonomics standards in GNPC's workplace environment to help improve on employee performance.

5.2 SUMMARY OF FINDINGS

Office ergonomics is a widely acceptable means of providing an enabling environment that best facilitates employees' performance and general productivity. The need for high office ergonomic standards is vital considering the fact that the type of employee work place environment impacts a great deal on employee collaboration, health and safety, morale, motivation and overall performance.

This study sought to discover the impact of office ergonomics on employee performance using the Ghana National Petroleum Corporation (GNPC) as a case study. The objectives of the study were to analyze the office design, finishes and furnishing of the head office building of GNPC, identify ergonomic features in the design, finishes and furnishing in terms of their suitability and comfort of the employees, assess the impact of office ergonomics on

the performance of GNPC employees at the Petroleum House in Tema and finally propose specific ergonomically based interventions that would address employee health, comfort and wellbeing and thereby enhance optimum performance.

The case study approach was adopted in this study which involved GNPC employees operating from the Petroleum House in Tema. Using random procedure and structured questionnaire as the main sampling and data collection tools respectively, responses were obtained from 88 staff for analysis. In addition, 10 heads of identifiable Units and Managers were also interviewed for more in-depth information on the subject. The data obtained were analyzed quantitatively using the SPSS and Microsoft Excel, and results presented through frequency distributions, pie charts, tables, and graphs. Pictures of unique offices showing office arrangement, seating arrangement, furniture etc. were also included for good visual effect.

The research identified considerable office ergonomic deficiencies which included less productive office design (predominantly cellular offices), uninspiring office décor, use of dark wooden partitions which has resulted in poorly illuminated offices, and the continuous use of un-ergonomic furniture at the Petroleum House.

The study discovered that GNPC occupied the Petroleum House in 1989. The Petroleum House was then partitioned into predominantly cellular offices with polished plywood panels which was then in vogue. Over the years, the original design and décor has since seen little

improvements and modifications such as tiling of some of the hitherto terrazzo floors, replacement of selected plywood partitions and the building's disused passenger lifts.

The study also confirmed that the ergonomic deficiencies have had varying adverse effects on the performance of GNPC employees and in some cases the health of employees. Ergonomic elements such as office design, décor, illumination and noise levels and furniture were found to be negatively affecting the performance of employees by between 20-80 percent. It also came to light that few GNPC employees had suffered musculoskeletal disorders which they attribute to their furniture.

5.3 CONCLUSION

This study has assessed the impact of office ergonomics on the performance of GNPC employees operating from the Petroleum House in Tema. The results from the study confirm that office ergonomics deficiencies at the Petroleum House are impacting negatively on the performance of the employee.

From the findings of the study, which identifies substantial office ergonomic lapses such as inadequate office illumination, use of un-ergonomic furniture, appreciable noise levels and pockets of safety hazards, it is obvious that GNPC is yet to leverage on its workplace environment as a means of motivating and enhancing the performance of its employees.

5.4 RECOMMENDATIONS

In view of the findings and conclusion of the study, the following recommendations are made for consideration by GNPC as a means of utilizing its workplace environment to motivate and enhance the performance of its employees.

The findings from the study clearly show that the design and décor of the Petroleum House is somehow deficient in ergonomics and has some negative impacts on the performance of employees. Given the state of the Petroleum House, any attempt to modernize the building will require a huge capital outlay and a considerable period of time. Against this backdrop, the study recommends the relocation of the GNPC head office to a purpose-built office facility that integrates high standards of office ergonomics, and identifies with GNPC's real estate objectives. With the help of a market survey, GNPC can identify alternative office facilities that will be most suitable for the operations and aspirations of the Corporation.

In the design and décor of the proposed new GNPC head office building, emphasis should be made on the use of executive suites of open plan offices that inspires teamwork and collaboration. The open plan offices as reported in Hamilton et al. (1996) should be complemented with meeting rooms, breakout areas, isolated enclosed offices and other ancillary offices/facilities that will be essential to the peculiar operations of GNPC. The new office should incorporate brighter office partitions with exciting colour schemes that will stimulate employees and help reduce stress levels.

The study further recommends that GNPC should undertake post-occupancy evaluation one year after occupation of the new GNPC head office. The post-occupancy evaluation should involve the circulation of a multi-disciplinary questionnaire once a year among all employees of GNPC to determine how the workplace elements such as furniture, illumination, noise levels etc. are affecting their performance. Based on the results of the survey, ergonomic

adjustments should be made to render the workplace environment more supportive to employee performance.

The study further recommends that GNPC should develop and implement a Corporate Real Estate Policy that will focus on leveraging GNPC workplace environment to attract, retain and boost the performance of GNPC employees. The Policy should focus on modern ways and systems of working that optimizes employee delivery and productivity.

The study identified a number of health and safety concerns in the form of un-ergonomic furniture, poor illumination levels and poor cable management in selected offices leading to 42 percent of the respondents claiming not to feel safe and secured in their offices. The development and implementation of a health and safety policy to help identify and deal with health and safety hazards at GNPC offices is strongly recommended. Similarly, the adoption of enterprise risk management system to systematically identify risk factors in the office and pragmatically deal with them is further recommended by the study.

Lastly, employees should be made to undergo periodic training on office ergonomics issues such as correct sitting posture, the right way to use and adjust computer monitor to avoid neck, back and eye strain, how to reduce stress and strains in repetitive work and how to avoid injury and disorders at the workplace. The training is expected to enlighten employees on the subject to help employees contribute meaningfully to the development of office ergonomic interventions.

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APPENDIX A
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI
COMMOMWEALTH EXECUTIVE MASTERS IN BUSINESS ADMINISTRATION
(CEMBA)

QUESTIONNAIRE FOR DATA COLLECTION

TOPIC: IMPACT OF OFFICE ERGONOMICS ON EMPLOYEE PERFORMANCE:

A CASE STUDY OF GHANA NATIONAL PETROLEUM CORPORATION (GNPC)

INTRODUCTION:

This is an academic exercise aimed at gathering primary data towards the writing of a thesis on the above topic. Your co-operation in providing honest and prompt responses to the questionnaire would be very much appreciated. You are also assured of the privacy and confidentiality of your responses. Thank you very much.

Please tick or write out your responses where appropriate

SECTION A: SOCIO-DEMOGRAPHIC DATA OF RESPONDENT

1. Gender 1. Male [] 2. Female []
2. Age 1. 20-29 yrs. [] 2. 30-39 yrs. [] 3. 40-49 yrs. [] 4. 50 yrs. and above []
3. Level of work 1. Junior Staff [] 2. Middle level staff []
3. Senior management []
4. Division/Department/Unit _____
5. Length of service at GNPC 1. 0-1 year [] 2. 2-3 years [] 3. 4-6 years []
4. 7-9 years [] 5. 10 years or more []

SECTION B: LEVEL OF EMPLOYEE SATISFACTION WITH OFFICE ENVIRONMENT

6. Please indicate your level of satisfaction with each of the under listed workplace elements using the ratings from 1 to 5 described below (by ticking) as:

- 1-Very Satisfied (VS), 2-Satisfied (S) 3-Dissatisfied (D)**
4- Very Dissatisfied (VD), 5-Undecided (UN)

NOTE: For each response kindly indicate the reason for your choice. You may use the sample reasons below the table as a guide.

Table 1: Employee satisfaction with office environment

Brief Description of Workplace Elements	1 (VS)	2 (S)	3 (D)	4 (VD)	5 (UN)
1.General Design and Office Décor					
<i>Reason</i>					
2.Spatial Arrangement & Furnishing					
<i>Reason</i>					
3.Level of office flexibility and comfort					
<i>Reason</i>					
4.Size of space allocated for your workplace					
<i>Reason</i>					
5.Ease of communication and collaboration					
<i>Reason</i>					
6.State and suitability of office furniture					
<i>Reason</i>					
7.State of office Equipment (computers etc)					
<i>Reason</i>					
8.Room temperature and air quality					
<i>Reason</i>					
9.Quality of lighting – artificial lighting					
<i>Reason</i>					
10.Level of noise from speech, equipment etc					
<i>Reason</i>					

Sample Reasons

- *Office is too small and crowded*
- *Office is dark and not lively*
- *Furniture/equipment is modern and functional*
- *Office is noisy*
- *Office is well air-conditioned and comfortable*

- *There is ease of communication, etc, etc.*

SECTION C: IMPACT OF OFFICE ERGONOMICS ON EMPLOYEE HEALTH, SAFETY AND SECURITY

7. Do you find your current office safe and secured

Yes No

8. Does your office have enough space for easy movement and emergency exit

Yes No

9. Have you ever felt stressed by your office environment (furniture, decor , air-conditioner)

Yes No

10. Do you feel that your office environment (including your chair, desk and computer) has affected your health in anyway?

Yes No

11. Have you suffered any injury/disorders/illnesses due to your current workplace environment

Yes No

If you have answered “Yes”, please state the nature of illness and the attributed course

12. To what extent did the disorder/illness affect your job performance?

1. Very much affected [] 2. Affected [] 3. Mildly affected [] 4. Not affected at all

Please explain how your job performance was affected as indicated in the Question above.

SECTION D: IMPACT OF PHYSICAL OFFICE ENVIRONMENT ON EMPLOYEE PERFORMANCE

13. Please select the option below that best describes your current office environment

1. Highly Impressive [] 2. Impressive [] 3. Least Impressive []
4. Indifferent [] 5. Not Impressive [] 6. Can't tell []

14. Indicate to what extent your current office environment is a source of motivation to your job performance

1. Highly Motivating [] 2. Motivating [] 3. Least Motivating []
4. Indifferent [] 5. Not Motivating [] 6. Can't tell []

15. Is your furniture comfortable, flexible to adjust, rearrange or reorganize to offer you support and functionality?

1. Completely Flexible [] 2. Fairly Flexible [] 3. Almost []
4. To some extent [] 5. Not at all [] 6. Don't know []

16. Is your office environment quiet enough for productive work?

1. Always [] 2. Mostly [] 3. Often []
4. To some extent [] 5. Not at all []

17. Is your office room temperature conducive enough for productive work?

1. Always [] 2. Mostly [] 3. Often []
4. To some extent [] 5. Not at all []

18. Is your office room well illuminated for productive work?

1. Highly illuminated [] 2. Illuminated [] 3. Fairly illuminated []
4. Poorly illuminated [] 5. Not at all []

19. Using the scale below, please indicate the extent (in percentage) to which the workplace elements affect your job performance by ticking.

- a. Below 10% - 0
- b. Between 10% - 20% - 1
- c. Between 30% - 40% - 2
- d. Between 50% - 60% - 3
- e. Between 70% - 80% - 4
- f. Between 90% - 100% - 5

Table 3: Effects of workplace elements on employee’s performance

Brief Description of Workplace Elements	0	1	2	3	4	5
1. General Design and Office Decor						
2. Spatial Arrangement & Furnishing						
3. Size of office space and level of comfort						
4. Ease of communication and collaboration						
5. State and suitability of office furniture						
6. State of office Equipment (computers etc)						
7. Room Temperature						
8. Level of air quality (fresh air, stale air)						
9. Quality of lighting – artificial lighting						
10. Level of noise from speech, equipment etc						

20. Does your current workplace environment require improvement? Yes No

If you have answered “Yes”, please state the nature of improvements required

21. Please offer any suggestions that will improve your safety, comfort, security and performance at the workplace.

THANK YOU VERY MUCH FOR YOUR PATIENCE AND YOUR RESPONSES