UNIVERSITY OF EDUCATION, WINNEBA

ASSESSING THE LEVEL OF COMPLIANCE TO THE BUILT-INFRASTRUCTURE PROVISIONAL REQUIREMENTS OF THE DISABILITY ACT, 2006 (ACT715) AMONG PROFESSIONALS WITHIN THE BUILT ENVIRONMENT IN THE KUMASI METROPOLIS

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MAY, 2019

DECLARATION

CANDIDATE'S DECLARATION

I hereby declare that this dissertation is the result of my own original research. With the exception of quotations and references contained in published works (which have all been identified and acknowledged) the entire dissertation is my own original work, and it has not been submitted, either in part or whole for another degree elsewhere.

Candidate's Name: Isaac Akwasi Nkrumah

………………………………..   …………………………

Signature   Date

SUPERVISOR'S DECLARATION

I, hereby declare that the preparation and presentation of this dissertation was supervised in accordance with guidelines and supervision of dissertation laid down by the University of Education, Winneba.

Supervisor's Name: Mr. Michael Tsorgali

………………………………..   …………………………

Signature   Date

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DEDICATION

This project is dedicated to my wife and children Mrs. Veronica Baako Nkrumah, Mabel Adwubi Nkrumah and Eleazar Acheampong Nkrumah

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ABSTRACT

This study assessed the level of compliance to the built-infrastructure requirements of the Disability Act (715) among professionals within the Built-environment industry in the Kumasi Metropolis. The study seeks to measure the level of compliance to the built-infrastructure requirements of the Disability Act (715), assess the compliance to the built-infrastructure requirements of the Disability Act (715) in Ghana by stakeholders in the study area and investigate compliance to the built-infrastructure requirements of the Disability Acts (2006) in Ghana. The study elicited responses from a range of stakeholders within the built-environment industry in the area. Questionnaire was used to collect primary data from a randomly selected 104 professionals within the built-environment industry. Descriptive statistics were employed to analyze the data for the study. Results of the study showed that the level of compliance to the built-infrastructure requirements of the Disability Act among construction professionals within the Kumasi Metropolis was low. Also, the results showed that the level of compliance to the built-infrastructure requirements of the Disability Act in the study area is significantly influenced by such variables as industry experience, level of education, policy of compliance and knowledge of the Disability Act. The study further showed that the absence of national standards and high budget allocation are the most pressing constraints to compliance with the built-infrastructure requirements of the Disability Act (2006) in the study area. The study recommends that certain portions of the Disability Act should be amended to incorporate enforcement provisions. Stakeholders in the industry should regularly organize conferences, seminars and workshops in order to educate and upgrade the knowledge base of the professionals and all those who matter in the construction field. Finally, formal training institutions such as universities and technical universities should mount courses that may introduce topics under compliance to the built-infrastructure requirements of the Disability Act in Ghana.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

One billion people, constituting 15% of the total population in the world, live with one form of disability or the other (WHO, 2015). Over 79% of the world disabled people live in developing countries, under worse conditions of life (WHO, 2015). Their poor standard of living stems from the stark reality that, for a very long time, they have terribly lacked access to basic rights. Thus, in general terms, disabled people, in most cases, lose their political, economic and social rights. One of the key social discrimination issues they face is their limited accessibility to built-infrastructure especially in public buildings. According to Wiman & Sandhu (2004), about 25% of the world population do not have barrier-free access to built-infrastructure, due to the fact that majority of them are not designed to suit the usability of all people. That is, people with disability face direct discrimination or obstacle to the infrastructure, especially in the public environment.

It was on the back of such issues of discrimination and other human rights violation against disabled people, that the Convention on the Rights of Persons with Disabilities (CRPD) and its operational Protocol (A/RES/61/106) was inaugurated in New York in 2006. Among other things, the convention gave a signal for the protection and guarantee of full and equal enjoyment of human rights and fundamental freedoms to all persons with various forms of disability, and to expand and promote absolute respect for the dignity of disabled persons. One monumental landmark of the convention was the adoption of Article 9 which advocated for the "universal design" and technical standards as the basic yardstick in the design and construction of built-infrastructure to serve the needs of users of public facilities. According to (Agarwal &

Chakravarti, 2014), the adoption of universal design provides and improves accessibility comfort to people with mobility problems due to age, medical conditions, physical predicaments and permanent disabled conditions.

In the wake of the conference, signatories or member states, especially of the developed countries have incorporated universal designs in their built-environment statutes and legislation. Therefore, it has become incumbent upon built-environment professionals, practitioners and stakeholders within those jurisdictions to show compliance to the built-infrastructure requirements needed to guarantee to a barrier-free access to all, particularly, people with disability (Agarwal & Chakravarti, 2014).

Four year later after the CRPD, the UK elaborately modified United Kingdom's Disability Act 1995 into Equality Act 2010 to adequately reflect concerns adopted during the conference. This laudable development has tremendously improved the level of compliance to the built-infrastructure requirements to the Equality Act 2010 among practitioners in the built-environment industry. Specifically, the inclusive design and accessible environment provisions of the Equality Act 2010 compel stakeholders within the built-environment to comply with the built-infrastructure requirements (Clarkson & Coleman, 2013). Construction professionals in the UK are required to comply strictly with the Specific Building Regulations of the Act in the design, alteration and construction of buildings. Also, service providers are under strict obligation to make reasonable alterations to their buildings of operation and provide accessibility aids in order to guarantee a barrier-free access to disabled persons. Where service providers fail to make adjustments to their building and fit them with ramps and stairways, the disabled service users may file a lawsuit to claim valuable compensations (Clarkson & Coleman, 2013).

Similarly in the United States of America, substantial adjustments were made to portions of the Americans with Disability Act (ADA) 1990. This was the ADA Standards for Accessible Design

2010 which prescribed specific technical requirements in relation to the design of new buildings and redesign of existing and old buildings. To this end, both private and public buildings such as businesses, restaurants, hotels, schools, churches and other buildings of service providers were to strictly comply with the built-infrastructure requirements of the Act. Owing to ADA non-compliance most businesses and both private and public entities have been closed down whilst a number of them have to face legal actions in court resulting in large payments of compensations to disabled persons who may face barriers in using building facilities.

The Persons with Disability Act (Act 715) was in 2006 introduced by the government of Ghana, following a series of intense campaign by various domestic stakeholders to ensure its passage into law. The main objective behind the passage of the Act was to promote the socio-economic status of people with disability who, for a long period of time, have been denied access to their basic social and economic rights.

The Disability Act 715, 2006 defines a person with disability as *"an individual with a physical, mental or sensory impairment including a visual, hearing or speech functional disability which gives rise to physical, cultural or social barriers that substantially limits one or more of the major life activities of that individual"*.

Among other things, the Act is to promote the accessibility of people with disability to equal employment opportunities and to provide free or reduced cost of transport to disabled persons (Ghana Disability Act, 2006). More importantly, the built-infrastructure provisions of the Act specify that:

"*The owner or occupier of a place to which the public has access shall provide appropriate facilities that make the place accessible to and available for use by a person with disability"*

"A person who provides service to the public shall put in place the necessary facilities that make the service available and accessible to a person with disability" (Ghana Disability Act, 2006)

Section 60 of the same Act made transitional provision of ten (10) years for all existing public buildings including public institutions like hospitals, universities and MMDAs to be disability friendly.

Despite the penalty for contravention of the provisions of the Persons with Disability Act 2006, stakeholders within the built-environment industry continue to show non-compliance to the built-infrastructure requirements of the Act. Thus, according to Kportufe (2015), poor enforcement remains the main challenge hindering the successful compliance to the Disability Act in Ghana.

The study, therefore, seek to assess the level of compliance to the built-infrastructure requirements of the Disability Act (715) among the built-environment professionals in the Kumasi Metropolis.

1.2 Statement of the problem

The promulgation of the Disability Act (2006) in Ghana was meant to end all forms of abuse and discrimination against the fundamental human rights of disabled persons. Most of it all, the passage of the Act was to guarantee barrier-free access of disabled persons to infrastructure in buildings, particularly public facility and service providers. The Act prescribes that *"the owner or occupier of a place to which the public has access shall provide appropriate facilities that make the place accessible to and available for use by a person with disability"*

"A person who provides service to the public shall put in place the necessary facilities that make the service available and accessible to a person with disability" (Ghana Disability Act, 2006).

Achieving the objective of improving disabled persons access to public buildings requires a concerted effort by stakeholders, practitioners and professional within the built-environment industry to comply with built-infrastructure requirements of the Disability Act, 2006.

However, there is very limited or low level of compliance to the built-infrastructure requirements of the Disability Act, 2006, because most public buildings within the Kumasi Metropolis are inaccessible to disabled persons. Public buildings within the Kumasi Metropolis cannot be comfortably accessed by wheelchair users after auditing eighty-four (84) public buildings, including education facilities, health facilities, ministries, banks, buildings for religious groups and within the Kumasi Metropolis (Yarfi *et al.,* 2017). Moreover, it is revealed that despite modifications to most of the public buildings in Kumasi Metropolis, they still remain inaccessible to the visually impaired persons (Tchiakpe *et al.,* 2018). More so, Sasu *et al.* (2016) concluded that over 90 per cent of compound houses within the Metropolis were not friendly to persons with disability. The researcher's close observation of built-infrastructure in public tertiary institutions, public health facilities, government departments and agencies has revealed that they were not adequately barrier-free to disabled persons. The researcher's observation revealed that the buildings either lacked or had inadequate routes, entrances, height of steps, grade of ramps, sinks, entrance to washrooms, toilets, urinals, seats and space for wheelchairs users, underfoot warnings and directional signs.

It has been found that stakeholders, practitioners and professionals within the built-environment industry are constrained in their efforts to comply with the built-infrastructure requirements of the Disability Act. According to Tudzi, *et al,* (2017), the national legal structures in a Ghana to compel the various stakeholders to strictly show compliance to the built-infrastructure requirements are structurally feeble. Also, a national building framework to guide built-environment professionals in the design and construction of barrier-free facilities is non-existent (Kportufe, 2015). It is conspicuously clear that the infrastructure of the public buildings within the Kumasi Metropolis do not promote comfortable accessibility to persons with disability because contractors, engineers, planners, quantity surveyors, Kumasi Metropolitan Assembly, Public Works Departments, Managers of tertiary institutions, owners of buildings and other stakeholders and professionals in the built-environment industry have virtually failed or done very little to comply with the built-infrastructure requirements of the Disability Act (715).

It is against this background that this research seeks to assess the level of compliance to the built-infrastructure requirements of the Disability Act (715), 2006.

1.3 Purpose of the study

The purpose of the study is to investigate compliance with the built-infrastructure requirements of the Disability Act (715) in the Kumasi Metropolis.

1.4 Objectives

The objectives of the study are to:

1. measure the level of compliance with the built-infrastructure requirements of the Disability Act (715) in the Kumasi Metropolis.
2. assess the compliance to the built-infrastructure requirements of the Disability Act (715) in Ghana by stakeholders in the study area in the Kumasi Metropolis.
3. investigate compliance to the built-infrastructure requirements of the Disability Acts (715, 2006) in the Kumasi Metropolis.

1.5 Research Questions

1. What is the level of compliance of the built-infrastructure requirement of the Disability Act 715 (2006) of Ghana in the Kumasi metropolis?

2. Does the level of compliance to the built-infrastructure requirement of the Disability Act of Ghana by stakeholders adequate in the Kumasi metropolis?
3. What can be done to enhance effective awareness and compliance to the built-infrastructure requirements of the Disability Acts 715, (2006) in Ghana?

1.6 Justification of the study

- The study, therefore, seeks to investigate/assess compliance to the built-infrastructure requirements of the Disability Act, 2006 in Ghana.
- The results of the study will provide useful information to policymakers and other stakeholders in making decisions that will promote compliance and ultimately ensure barrier-free access to public buildings by people living with a disability.
- The outcome of the study will serve as a guide and reference point for future researchers who may intend to pursue further studies on the subject matter.

1.7 The Scope of the Study

The scope of the study was limited to level of compliance to the built-infrastructure requirements of the Disability Act and the identification and ranking of the constraints to compliance to the built-infrastructure requirements of the Disability Act. The focus of the study was geographically restricted to the Kumasi Metropolis with data elicited from the built-environment professionals within the study area.

1.8 Methodology

Descriptive survey designs with both quantitative and qualitative approaches were used by the researcher to undertake the study. The target population comprised all built-environment professionals within the Kumasi Metropolis. This study adopted both probability and non-probability sampling techniques. Stratified random sampling was used to collect quantitative data from the various professionals within the built-environment industry. The researcher used questionnaires, interview guide and observations for collecting both quantitative data and qualitative data. Descriptive statistics such as mean percentages and frequency tables were used to summarize the demographic variables.

1.9 The Organization of the Study

The study has five chapters. Chapter one looks at introduction to the study comprising the background of the study, statement of the problem, purpose of the study, research questions, justification of the study, the scope of the study and the organization of the study.

Chapter two is a review of literature related to the compliance to the built-infrastructure provisional requirements of the Disability Act, 2066 (Act715) among professionals within the built environment. Conceptual, theoretical framework of disability and empirical studies on accessibility of public infrastructure to disabled people are looked at. Literature on professional in the built-environment industry such as Architects, Quantity Surveyors, Engineers and builders are reviewed and presented. The researcher also reviewed constraints to Compliance to the built-infrastructure Requirements of the Disability Act (715). Features and components which help to enhance the built infrastructure are reviewed in this chapter.

Chapter three presents the methodology which includes research design, population, sampling techniques and sample size. Questionnaires, interviews and observations were the data collection instruments employed in the study. This chapter finally looks at data analysis and conceptual model of the work. Results and discussion are presented in chapter four. Chapter five presents the summary of the findings, conclusion and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews related literature on the topic under study. The review covers conceptualizing disability, theoretical framework of the level of compliance to the built-infrastructure requirements of the Disability Act, empirical studies on accessibility of public buildings to disabled persons, professionals in the built-environment industry etc.

2.1 The Study Area

Historical Background of Kumasi Metropolis

A number of city-states were brought together under a strong political leadership to form the Asante state. The capital city was therefore moved from Kwaman to Kumasi by the then able leader and King Osei Tutu. In the wake of this development, the British colonial masters in 1935 reinstated the Asanteman Council which served as the traditional ruling body of the erstwhile Asante kingdom. Kumasi therefore served as residence of the Asanteman Council, even though, supreme political powers were still exercised by the British colonialist which resided in the capital city of Accra (Adu-Boahen, 1971).

The Kumasi Metropolis has for a very long time been known as the "Kumasi City Council" before 1995 when the then government of Ghana instituted a number of reforms in local government administration (Adu-Boahen, 1971). The beauty of the environment, coupled with, the green vegetative atmosphere and ambiance which have characterized the metropolis earned it the label "Garden City of West Africa". It sprang out expansively from the locus of three key towns namely; Adum, Krobo and Bompata such that the nucleus of the Kumasi metropolis will stretch out to cover a geographical expanse of approximately ten (10) kilometers in radius (Afrifa, 2000). The magnitude of the development of the metropolis initially sprang along the arterial roads because that area of the township increased access to a number of business entities and individuals, thereby promoting activities of trade which in turn sparked off the spectrum of development (Afrifa, 2000).

Currently, Kumasi Metropolitan Assembly (KMA) is on record as the largest and most populous city in the country after the national capital of Accra. Owing to the strategic location of the metropolis, it has become a center stage and open access to inland transport terminal. Therefore, it is to say, that the inland transport terminal has the capacity to stimulate the growth of trade and facilitate the exchange of goods and services in Ghana and for that matter the entirety of the continent.

Physical Features of Kumasi Metropolis

The physical features of the Metropolis consist of the natural environment i.e. the climate, vegetation, relief and drainage, and its location and size. The quality of the life and livelihood of the inhabitants of the metropolis is largely dependent on the favorability of the abounding natural environment, in consonance with, the socio-cultural the people enjoy. It is therefore conspicuous that the improvement in the socio-economic aspect of the people hinges on how effective and efficient they may utilize both the physical and the natural environment to their benefit.

Location and size of Kumasi Metropolis

Geographically located between Latitude 6.35oN and 6.40oS and Longitude 1.30oW and 1.3.5 E with 250 to 300 meters beyond sea level, the Kumasi Metropolis is among the thirty (30) districts within the Ashanti Region. The metropolis is bordered to the north by the districts of Kwabre East and Afigya-Kwabre and to the west by Atwima-Kwanwoma and Atwima-Nwabiagya. To the east, the metropolis shares boundaries with Asokore-Mampong and Ejisu-Juabeng Municipality, and to the south by Bosomtwe District. It covers a surface area of approximately 214.3 square kilometers which is about 0.9 percent of the total land area of the region. However, the population of the metropolis account for 36.2 percent of the total population in the region (Afrifa, 2000).

There exists a strong socio-economic relationship between the neighboring districts as well as the national capital of Accra. The neighboring districts serve as food producers to feed the metropolis and the national capital, as a whole. This therefore has the potential to create economic prosperity and sustainability among the inhabitants of the metropolis, the neighboring districts and the national capital of Accra, and even beyond. This, in part, has been the reason for which the metropolis has been noted as a hub for extensive commercial activities. Additionally, the metropolis has attracted dwellers from the neighboring districts and even the national capital due to the huge presence of educational opportunities, health care provision, banking services, inter-city transport and trade activities (Afrifa, 2000).

Fig. 2.1 Map of the Kumasi Metropolis

Disability within the Metropolis

Persons with disability within the metropolis are characterized with poor socio-economic status. They are characterized with low income, poor health status, low literacy level and higher poverty levels (World Health Organization, 2011). The issue of disability has attracted a nationwide attention owing to the significant impact it tends to have on the economic development. Therefore, in order to tackle poverty comprehensively, then the socio-political institutions of state should consider making people with disability economically productive.

According to figures provided by the Ghana Statistical Service (GSS), the population of people with living with disability (PWD) is 42, 060 which constitute 2.4 percent of the total number of people living in the metropolis. The sex composition of PWD is found to be 2.5 percent females as against 2.3 percent of male. Data provided by the GSS have indicated that the percentage of PWDs with sight impairment is 42.8, whilst 22.5 percent are physically disabled. Whereas PWDs suffering from emotional disability 18.1 percent, those with intellectual, speech and hearing impairment constitutes 14.4 percent, 12.9 percent, and 11.9 percent, respectively. In terms of proportional analysis, there are slightly more females (44.7%) with sight disability than males (40.4%) and there are slightly more males (15.6%) than females (10.7%) with speech impairment. For all the other types of disabilities there seem to be little variations in proportions between males and females (World Health Organization, 2011).

2.2 Conceptualizing disability

At any point in time, one can have one form of physical disability or another. This could be permanent or temporal. The temporal form of disability may be as a result of a broken limb, pregnancy, ageing, among the most common. In the same vein, according to the guiding principles as contained in draft of the International Classification of Impairments, Disabilities and Handicaps (ICIDH), a physical disability is synonymous with a physical impairment

(Physical Disability Council of Australia (PDCA), 2004). Physical disability takes several forms i.e. the victim may have lost their sight, confined to a wheel or walk with a limited comfort such as the use of clutches, among the most common (Ward, 1979). Furthermore, Goldsmith (1976) adopted physical activity limitations to identify persons with disability. Goldsmith further explained that the condition of disability is clearly manifested during the performance of a physical activity. Thus, it is only when a particular form of disability impedes the progress of a productive activity that we can identify as a disability. This therefore implies that even though a person may at a point suffer a certain form of disability but that condition could still yield beneficial results.

Different disability models have evolved over time to reflect a particular thinking, with respect to circumstances that may create physical disability conditions. They include the social, individual, religious, medical and rights-based models. Imrie (2004) has conceptualized two models of disability. He has distinguished between the social and the medical models. He further explained the social model as societal barriers resulting from incapacitation caused by adverse environmental conditions. To him, the medical conditions of an individual may be the direct result of the disability. Therefore, the social circumstances of disability could be reversed when a conscious effort is taken to eliminate the barriers that sideline individuals with disability from having access to their social rights.

Barking & Dagenham (2001) branded the social model of disability as a variant of oppression. This form of oppression is characterized by physical exclusion from participation of benefits and to a very a large extent denial of some fundamental human rights.

Soyingbe et al, (n, d) has added that impairment is a key issue underlying the social model of disability. He describes impairment to mean the absence of a body part or the presence of a defective body part. Social entities have not done much to extend project benefits to reach the access of people living with disability.

Danso *et al.*, (2011) conceptualizes that it is rather the societal barriers that create the conditions of disability but not a particular impairment suffered by an individual. He added that the plight of individuals living with disability is affected by a number of factors. To him, policies and ethics of built-environment experts together with desire of disabled persons to stand for their socio-economic rights need to be intensified to help ameliorate the worsening living standards of people with disability.

Bayes and Franklin (1971) also noted that stressed that the growing efforts by various units of the society to profoundly understand the scope of disability was underpinned by the need to formulate policies in order to address the socio-economic challenges of people with disability. Gleeson (1999) stressed three elements underpinning the social models of disability. They are the structuralist, humanist, idealist and normalization models.

The structuralist exponents espoused that the social model of disability is conditioned by factors of social, economic, cultural, political and institutional nature. This espousal is however criticized on the grounds that it thoroughly discounts the substance of the individual traits in shaping up an individual social experience. The humanistic tradition contends that the society's treatment of the disabled persons is dehumanizing as they are often discriminated against in the disbursement of common resources. Thus, to Gleeson (1999), resources should be allocated equitably to the reach of the vulnerable groups in the society, especially disabled persons. The idealist approach perceived that society has nurtured negative attitudes towards people with disability. Disability, therefore, is identified as a negative element in the society and has the potential to bring stigma to the sufferer. This implies that it is the treatment of the society that causes the disability but not the impaired part of the body itself. Idealists strongly believe that it is also social change that may reverse such a trend.

Smith, Austin and Kennedy (2001) put forward the social model of normalization which has it that society must see the condition of disability as normal. They further detailed that seeing the condition as a social norm will facilitate their easier reintegration into the society since they have long suffered humiliation. This particular model has been criticized on the grounds that it has neglected society's diligence in eliminating behaviors and attitudes which perpetuate discrimination against people living with disability.

Oliver (1990) also brought about historical materialist model of disability which argued that how societal activities are organized such as access to benefits creates the conditions of disability. As a result, persons with disabilities experience discrimination at work places, transportation etc. because they suffer one form of disability or the other. These forms of exclusion have the tendency to psychologically affect the well-being of people living with disability. For example, inaccessible buildings, underfunded parallel transit systems, and poorly designed housing prevent many persons with disabilities from securing gainful employment and restricting them from working where or when they want. Oliver concluded that the effect of societal disregard and negative attitudes towards people living with disability outweighs the physical effect of the impaired part of the body. Young (1990) agrees with Oliver as he maintained that the policies and decisions of both private and public institutions have done very little to raise the socio-economic fortunes of people living with disability

2.3 Theoretical framework

In order to adequately guarantee barrier-free access to built-infrastructure to people with disability, there is the need for a high level of compliance to the built-infrastructure requirements of the Disability Act by stakeholders within the built-environment industry (Danso et. al., 2011). There is a strong relationship between the level of compliance to the built-infrastructure requirements of the Disability Act and demographic variables of professionals within the built-environment industry. These variables of interest included size of organization, industry experience, level of formal education, policy of compliance, incentive for compliance and knowledge of Disability Act.

Large size organizations tend to have the capacity to generate funds to finance productive activities and are mostly socially responsible (Albu & Albu, 2012). Therefore, large size organizations are more likely to show a high level of compliance to the built-infrastructure requirements of the Disability Act.

The industry experience of built-environment professionals has a great effect on the level of compliance to the built-infrastructure requirements of the Disability Act. Professionals with more working years have the depth of experience and are more concerned with professional ethical standards (Kent et al, 2010). Experienced professionals may show high level of compliance to the built-infrastructure requirements of the Disability Act, unlike the less experience counterparts.

Quite related to the industry experience, is the level of formal education of the built-environment professionals. Professionals with high level of formal education tend to upgrade and reinforce their skills and expertise to keep pace of the changing needs of societal circumstances (Salmen, 2001).

In an organization where there exist a policy of compliance, employees and other working staff become more inclined to showing compliance to the built-infrastructure requirements of the Disability Act (Smith, 1973).

Incentives for professionals are seen as a tool to raising the level of output and efficiency (Wilson & Wilson, 2003). Therefore, professionals in the built-environment industry are much more likely to show a high level of compliance to the built-infrastructure requirements of the Disability Act, where they are motivated through incentive packages.

Knowledge of the Disability Act has a strong influence on the level of compliance to the built-infrastructure requirements of the Disability Act. Some built-environment professionals are ignorant and this has the potential to cause “architectural disability’’ (Wilk, 2001). According to him, some construction professionals are very stubborn and are reluctant to change their old ways of doing things i.e. their perceptions and beliefs. Thus, construction-related professionals with training and retraining from periodic seminars, lectures and workshops are more likely to show a high level of compliance to the built-infrastructure requirements of the Disability Act.

2.4 Empirical studies on accessibility of public infrastructure to disabled people

A number of studies have been carried out over the years have been carried out to find if public building’s designing of public buildings are in compliance with provisions of the Disability Act. In their study to assess the extent of accessibility of disabled persons to some selected public buildings including National Theatre and Accra International Centre in the capital city of Ghana, Danso *et al.*, (2011), found that most of the buildings were difficult to be assessed by people with disability Also, facilities, such as car parks, ramps, entrances, corridors and staircases presented various degrees of restrictions to people with disability.

A research by Abdul-Rauf and Barima (2011) which sought to study the degree of restrictions posed by the environment in the central business district of Accra found that the existing signboards, telephone booths, kiosks, vehicles etc. which are parked on the shoulders of the road posed various forms of barriers to persons with disability. This implies that majority of public buildings in the business district of Accra do not comply with the built environment provisions of the Disabled Act.

A similar work was done by Tandoh and Mensah (2012) to study the accessibility of the environment of public buildings in the central business districts of Kumasi also recorded similar findings, as they found that gutters, poorly designed walkways with steep gradients, absence of ramps at entrances of public buildings presented various forms of barriers to wheelchair users who access the built environment.

It is evident from the above studies that almost all the public buildings including the tertiary educational institutions do not comply with meeting the building design requirements as spelt out in the Disability Act.

2.5 Professionals in the Built-environment Industry

Despite the differences in academic background, training and experience, different built-environment professionals come together to undertake a construction project with the view to achieving a common objective (Almahmoud and Doloi, 2013). That is to say that, depending on the nature of the building it takes a number of various construction professionals in order to deliver project goals (Chinyio and Olomolaiye, 2010).

Professionals in the built-environment industry include architects, engineers, quantity surveyors, and their roles are discussed as follows:

2.5.1 Architect

The architect is the entity or the organization that is charged with the responsibility of designing, sometimes, offering valuable advice in order to meet the building preference of the client. It is also a key responsibility of the architect to ensure that financial demands of the construction piece are kept within manageable cost (Hussin and Omran, 2009). In most cases, the architect is the designing tool of the construction piece. In the process of architectural designing, the architect factor in consideration and gather all the relevant information required to comply with public health safety and welfare.

Thus, according to Anyanwu (2012), the architect assists the client to put their building requirements in an achievable form and ensures that the specificity of the requirements to do not breach any statutory stipulations. In the course of shaping up the specifications of the client's requirements, the architect consider such vital parameters as the nature and form of the building site, since different site topography may vary with projects and design. For instance, it is practically unfeasible to undertake batching and concrete-mixing at exactly where the building is designed to stand. Anyanwu (2012) further posited that beyond the planning phase are the main construction activities. At this stage, there architect has the additional responsibility of ensuring the building site is visited and inspected periodically with the objective of making sure that the architectural designs and requirement are in consonance with plan.

2.5.2 Quantity Surveyor

Quantity Surveyors are built-environment professionals tasked with the responsibility of managing cost of construction and other building projects (Maarouf and Habib, 2011). According to Hussin and Omran (2009), quantity surveyors are endowed with expert knowledge thereby giving them the professional edge to undertake and determine pricing of labor materials and other requisite construction resources. In such instances, there is therefore optimal use of resources. In determination and management of the cost of construction resources, the quantity surveyor evaluates the scope of the expenditure to be borne, reviews the tender and undertakes the preparation of the valuations of resource items. The quantity surveyor also teams up with the architect concerned in ensuring effective cost control whilst they offer valuable advice with respect to the type of service to be provided as well as the details of project cost implications.

2.5.3 Engineers

There is a thin line between the role of engineers and architects in the area of built-environment industry. For instance, they offer advisory services in order to shape architectural designs and work. In fact, the starting point of an engineer's design is architectural layouts (Hussin and Omran, 2009). Apart from the production of building-related drawings, engineers formulate construction specifications, schedules and collect other vital information in order to achieve organizational objectives. Furthermore, according to Anyanwu (2012), as do architect, engineers have the additional responsibility of regularly visiting the construction site in order to carry out a comprehensive supervision with the objective of ensuring that building activities are in line with drawings, specifications and schedules. Thus, engineers are built-environment professionals with expertise of designing either certain portions of a building or the complete scope of a building. Most of the works of public utility are designed and constructed by engineers. Hussin and Omran (2009) broadened the scope of role of engineers to cover an extensive analysis of aerial photography, maps, drawings and other relevant items such as topographical information. In order to promote construction safety, the engineer undertakes a thorough analysis of the hydraulic components by way of calculating the rate of liquid flow and load and grade parameters in compliance with a body of well-defined construction codes and ethical principles.

This facet of the overall and comprehensive analysis is required to ensure that the building project can adequately withstand environmental stress and shocks. The foregoing processes are necessary before full scale construction takes in order to take care of any potential hindrances that have the potential to endanger the durability of the building project (Hussin and Omran, 2009). Engineers come in various types: the most common variants include structural engineers, electrical engineers, civil engineers, mechanical engineers and soil engineers. Whilst a structural engineer has the capacity to design a building structure, an electrical engineer undertakes the installation of electrical components in a building. Civil engineers are experts in designing roads, bridges, culverts, etc. but a mechanical engineer is responsible for the installation of room air-conditioners, elevators and plumbing works (Anyanwu, 2012). A soil engineer provides or has a unique specialty and technicality regarding the substance of soil.

Therefore, there is the need for an effective team work between architects and engineers in order to ensure the construction of a building project.

2.5.4. Builder

Obiegbu (2009) defined the roles of builders to include the preparation of report on how to build and maintain the project. They also formulate plans regarding the project management quality, the health and safety dimensions of the project as well as the programming and management of construction works. Obiegbu (2009) added that it is the professional responsibility of builders to undertake the specification of project materials as well as the workmanship of the project. The report on the details of building and maintaining the project is necessary to ensure the easiness and simplicity of building the project. Productivity is also enhanced due to the reduction of waste products which is achieved by excessive cutting of building components as well as the optimum utilization of site plant. Moreover, programming the work preparation details is necessary in order to define a particular procedure to be used the building at the site whilst the quality management plan produces information on building operations. According to Obiegbu (2009), the quality management plan is meant to serve the purpose of reference for site personnel as a guiding manual.

The safety management plan details the procedures of establishing safety culture on the construction site, and including statement on the welfare provisions on site, the first aid facilities and how to attend to an accident in event of any occurrence. Managing the construction process is about dynamics of the construction in order to achieve specified quality standards, and this includes ensuring on-site, and/or off-site implementation of all the project monitoring and control documents. In essence, builder roles are important to construction site management. The material handling and specification ensure that specifications are met on the site. Majority of these roles of Builders are site based while the others are linked to sites, one way or another.

2.6 Constraints to Compliance to the built-infrastructure Requirements of the Disability Act (715)

Following the passage of the Disability Act (715) in 2006, a lot of built-infrastructures within public buildings remain inaccessible to people with disability Danso et. al., (2011). The phenomenon in large part is due to low compliance by built-infrastructure professionals to the built-infrastructure requirements of the Disability Act. Among the factors cited for low compliance to the built-infrastructure requirements of the Act, are the following;

2.6.1 Poor enforcement of the Disability Act:

Poor enforcement or implementation has largely contributed to the phenomenon of low compliance to the built-infrastructure requirements of the Disability Act (715). Even though the Act exists, very little or no effort by the various stakeholders has been put up to enforce compliance to the built-infrastructure requirements of the Act. According to Imrie (2002), national legal structures in a number of countries all over the world to compel the various stakeholders to strictly show compliance to the built-infrastructure requirements are structurally feeble and are fraught with a number of loopholes for exploitation. To further illustrate this point, the national building code in United Kingdom, for instance, is ineffectively weak to the extent that stakeholders including construction professionals in the built-environment industry largely show very little compliance in order to provide barrier-free access to people with disability. Even where there is effective compliance to the built-infrastructure requirements, it is limited only to the new buildings springing up and other renovated buildings in the country (Imrie, 2002). The resultant effect of the poor enforcement of the Act is that, majority of people living with disability continue to face difficulty in access to the built environment especially public buildings. In Uganda, Ojok (2012) indicated that poor institutional framework to compel enforcement to the built-infrastructure requirements is virtually non-existent, thereby doing more harm than good to the Ugandan Disability Act. Kportufe (2015) cited poor implementation among factors challenging the successful implementation of the Disability Act in Ghana. He added further that local government bodies such as the Metropolitan, Municipal and District Assemblies in Ghana lack the political will to compel the stakeholder groups to show high level of compliance to the built-infrastructure requirements of the Disability Act. Based on the foregoing cogent, it can be concluded that the existing legal frameworks in countries worldwide requires serious amendments in order to incorporate stern enforcement provisions in the Act with the objective providing barrier-free access of built–infrastructure to people living with disability.

2.6.2 Absence of National standards

Quite related to the above factor is the issue of the absence of national standards to serve as a national framework to guide stakeholders and construction professionals to show compliance to the built-infrastructure requirements of the Disability Act. The existing Draft Ghana Building Code (1988) and the National Building Regulations (1996) are virtually out of date and have since not been revised to meet the barrier-free provisions of the built-infrastructure requirements of the Disability Act (715) of 2006 in Ghana. This implies that Ghana as a country lacks a national policy framework which guides and compel stakeholders and built-environment professionals to comply with the built-infrastructure requirements of the Disability Act. Elsewhere in other developed jurisdictions, legal building instruments, international standards, building regulations and guidelines, codes of practice and so on have been created to promote barrier-free access of built-environment to people with disability. Among such legal instruments are the British Standards Institution (2001) – Design of Buildings and Their Approaches to Meet The Needs of Disabled People [BS8300 (2001)], Americans with Disabilities Act Accessibility Guide (2004) [ADAAG (2004)] and Accessibility for the Disabled, A Design Manual for a Barrier-Free Environment, Urban Management Department of the Lebanese Company for the Development and Reconstruction of Beirut Central District SOLIDERE (2004) – developed by the UK, USA and the UN, respectively, in order to overcome the restrictions and danger posed by built-environment to people with disability.

2.6.3 High Budget Allocation

The size of budget allocation for undertaking the designing and construction of an all-inclusive built-infrastructure to guarantee barrier-free access to both able-bodied and disabled persons is high (Ojok, 2012). Ojok (2012) also found in his study that high budget allocation has become a major impediment to compliance with the built-infrastructure requirements of the Disability Act in Uganda. Vandebelt (2001) posited that it requires high budget in order to design and construct all inclusive built-infrastructure to cater for the accessibility needs of members in the society as compared to traditional designs which excludes barrier-free access to people with disability. He, however, admitted that cost-effective all-inclusive built-infrastructure can be designed and constructed on the principle of embracing universal design. Similarly, Imrie and Hall (2011) noted that the provision of a fully accessible built-infrastructure requires a huge financial outlay. They further deliberated that, the design and construction of an all-inclusive built-infrastructure means that an additional space, fixtures, hardware and devices are needed in order to meet the complex specifications required, thereby raising the cost of such undertaking.

2.6.4 Lack of Stakeholder Commitment

Various stakeholders within the built-environment lack the needed commitment to promote high level of compliance to the built-infrastructure requirements of the Disability Act. This clearly evident in their inability to fully coordinate and cooperate in the area of planning and taking decisions that pertains to how effective they can comply with the built-infrastructure requirements of the Disability Act. For instance, Ojok (2012) revealed in his study that the poor coordination of activities between sector ministries, local government bodies and private entities were mainly the reason for low compliance to the built-infrastructure requirements of the Disability Act in Uganda. Similarly, Hassan (2012) also found that lack of cooperation among the various stakeholders in the built-environment industry accounted for the low compliance to the built-infrastructure requirements of the Disability Act of Malaysia. The issue of lack of stakeholder commitment partly stems from the exclusion of some primary and key stakeholders from the decision-making table. Various primary groups representing diverse disability groups are mostly sidelined in the discussion and deliberation of accessibility and compliance issues which directly affect their well-being (Ojok, 2012). Built-environment professionals and stakeholders mostly sit in the comfort of their offices, consult reference materials and produce designs which are not capable of addressing the infrastructure needs of people with disability.

2.7 Building Types

Lack of special provisions for the disabled regarding accessible buildings and facilities has been a challenge for society since every one cannot participate equally in everyday life. There is the need now more than ever to design to the extent possible, public buildings to be accessible to all. Buildings that have to comply with accessibility requirements for the disabled include all public buildings, governmental facilities and institutions, office buildings, educational buildings, utility service buildings, recreational facilities and all other building types normally used by the general public.

2.7.1 Public Buildings and accessibility standards

In educational buildings, for instance, all teaching, administrative and common areas should be accessible to a wheelchair user. Suitable arrangements should be made for stepped lecture halls or auditoriums. At least one accessible unisex wash room should be provided in each building other than student dormitories and residential accommodations.

The recreational facilities should be usable by disabled people, to the extent possible. Sports halls should be as accessible as possible to a wheelchair user. At least one shower room, one rest room and one changing room per facility should be accessible to a wheelchair user. Spectators' seating areas should be provided for wheelchair users as specified.

All library facilities and equipment should be accessible. The open book stacks should also be accessible.

2.7.1.1 Guards for safe keeping in pathways

Street pavements, pedestrian passages in open spaces and recreational areas, pedestrian underpasses and overpasses are all considered pathways or ramps. The minimum width of an unobstructed pathway should be 0.90 m. The minimum width of a two-way wheelchair traffic passage is 1.50 m. The preferable width is 1.80 m. For changes in level of more than 13 mm between the pathway and the surrounding surface, guards, up stands or other types of barriers should be used (SOLIDERE, 2004) .

Guards with a minimum height of 0.15 m should be used to separate pathways from planting areas, pools and landscape features (figure 2.1). The edges of the pathway should be beveled wherever there is changes in level between 6 mm and 13 mm exist between the pathway and the surrounding area (SOLIDERE, 2004) .

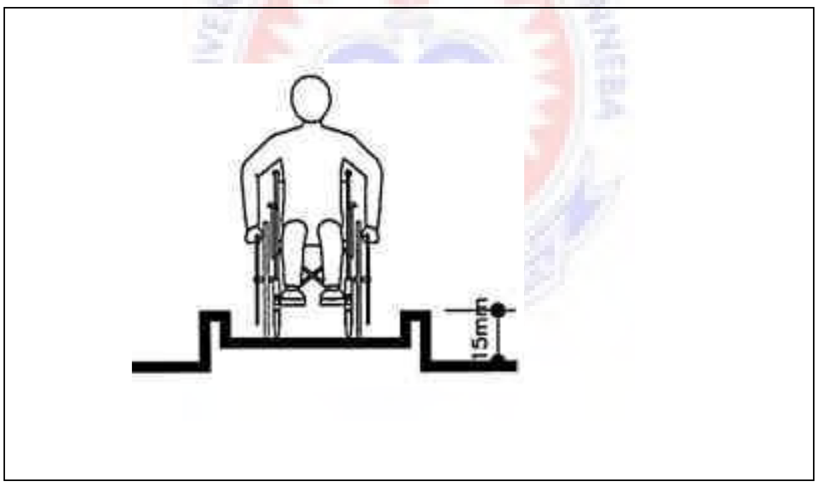

Figure 2.1: Guards for safe keeping in pathways. (Source: SOLIDERE 2004)

2.7.2 Assembly halls

Under this category fall, lecture halls, spectator seating in sports centers, and other assembly halls should have fixed seating. The number of spaces designated for wheelchair users in a seating should be made comfortable.

Some seats with removable or flip-up armrests should be provided at each row end in order to accommodate a wheelchair user or a person with limited ambulatory mobility. A level floor area for wheelchair users should be placed at row ends and should be scattered on different levels so as to have a variety of seating and viewing locations. (McClain-Nhlapo, 2006). Figure 2.3 shows a display of variety of seating and viewing locations for wheel chair users at each row end.

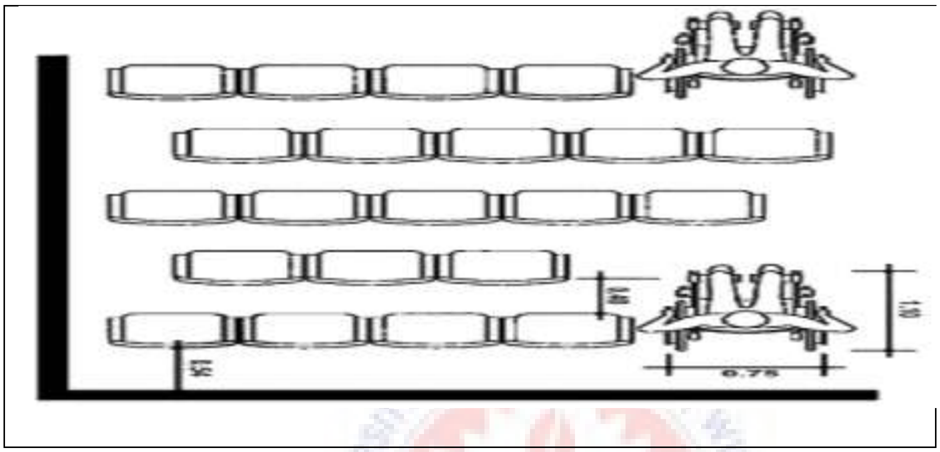

Fig 2.2: Variety of seating and viewing locations for wheel chair users at row ends
(Source: SOLIDERE 2004)

2.8 General Access Design Requirements

This will deal with the design requirements of vertical and horizontal access aids in both new and existing constructions. It takes into account such physical features as ramps, stairs, elevators, platform lifts, railings, entrances, vestibules, doors, corridors and car parks.

2.8.1 Ramps

A ramp can be configured as either straight run, ninety (90) turn, or switch back commonly known as 180 turns (Imrie and Kumar, 1998). The ramp configurations are diagrammatically represented in the figures below;

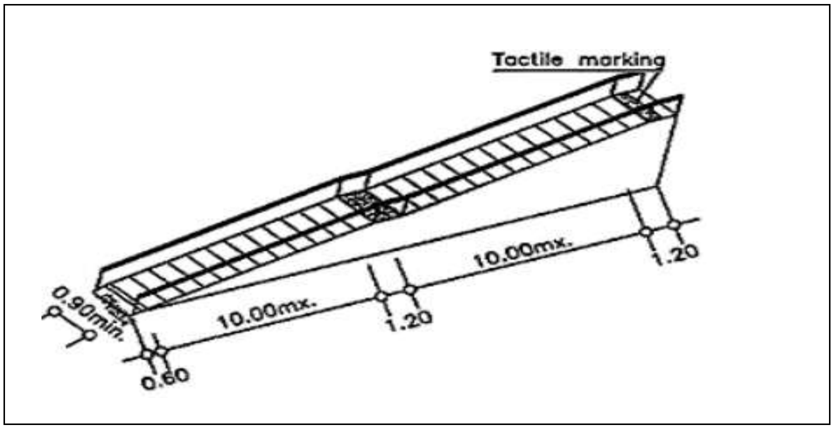

Fig. 2.3: Straight run ramp (Source: SOLIDERE 2004)

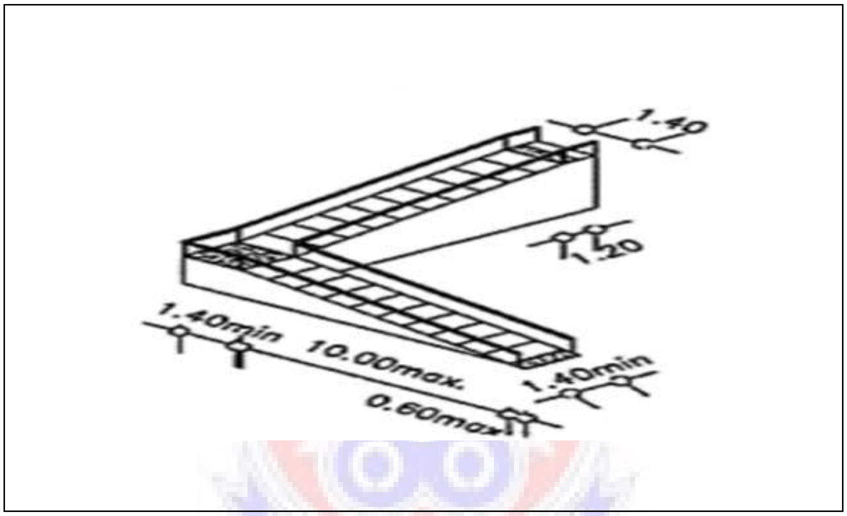

Fig 2.4: Ninety (90) turn ramp. (Source: SOLIDERE 2004)

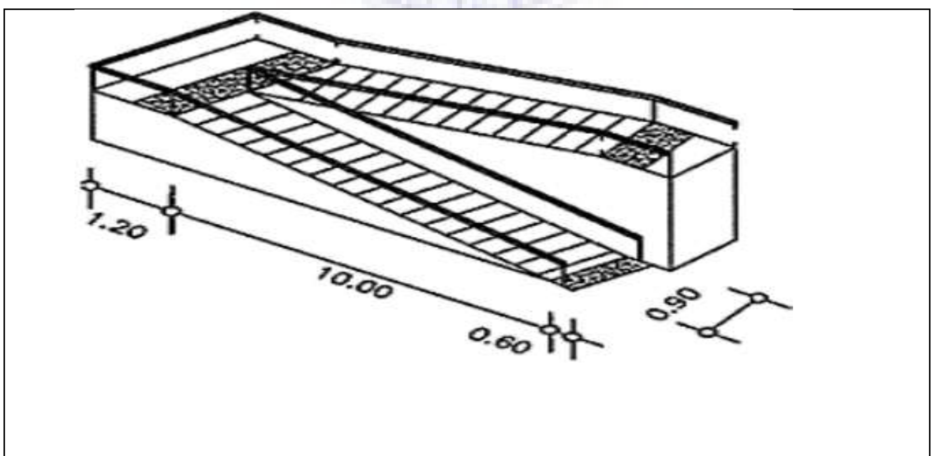

Figure 2.5: Switchback or 180 turns (Source: SOLIDERE 2004)

According to SOLIDERE (2004), buildings without ramps have inaccessible entrances due to the difference between indoor and outdoor levels and inaccessible routes due to differences in level. Such buildings also tend to lack improper ramp design with very steep and long ramps with no resting landings. Ramps are suitable wherever stairs obstruct the free passage of pedestrians who are mainly wheelchair users and people with mobility problems.

In the design of ramps, exterior location is preferable. Indoor ramps are not recommendable because they take up a great deal of space. In ideal situations, the entrance to a ramp should be immediately adjacent to the stairs (Kportufe, 2015).

The width varies according to use, configuration and slope. The minimum width should be 0.90 metres. The maximum recommended slope of ramps is 1:20metres. Steeper slopes may be allowed in special cases depending on the length to be covered. Figure 2.6 and Table 2.1 below shows the diagram of a recommended maximum slope of the ramp and approved maximum lengths and rises of various ramp slopes, respectively.

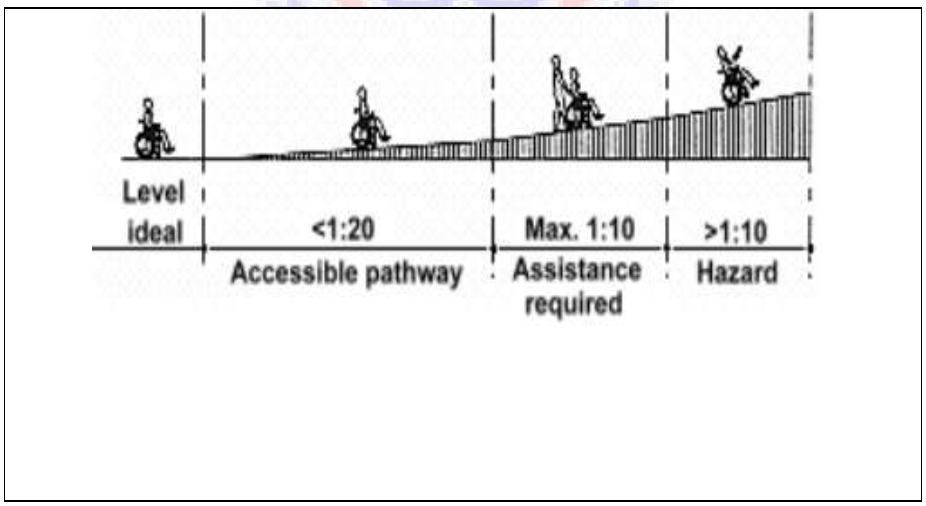

Fig 2.6: The recommended maximum slope of ramp (Source: SOLIDERE 2004)

Table 2.1: Approved maximum lengths and rises of various ramp slopes

Maximum slope	Maximum length	Maximum rise
1:20 i.e., 5%	-	-
1:16 i.e., 6%	8 m	0.50 m
1:14 i.e., 7%	5 m	0.35 m
1:12 i.e., 8%	2 m	0.15 m
1:10 i.e., 10%	1.2m	0.12 m
1:8 i.e., 12%	0.5m	0.06 m

(*Source: SOLIDERE 2004)*

Note: Considering the slope of 1:16 in the table above, the 6% refers to the amount of vertical height to be taken as a proportion of the horizontal length. The 6% is derived by dividing 1 by 16. This applies to all the other slopes in the table 2.1 above.

Ramps should be provided with landings for resting, maneuvering and avoiding excessive speed. Landings should be provided at every 10.00 m, at every change of direction and at the top and bottom of every ramp (Chinyio and Olomolaiye, 2010). The landing should have a minimum length of 1.20 m and a minimum width equal to that of the ramp.

A protective handrail at least 0.40 m high must be placed along the full length of ramps. For ramps more than 3.00 m wide, an intermediate handrail could be installed. The distance between handrails when both sides are used for gripping should be between 0.90 m and 1.40 m as shown in figure 2.7 below.

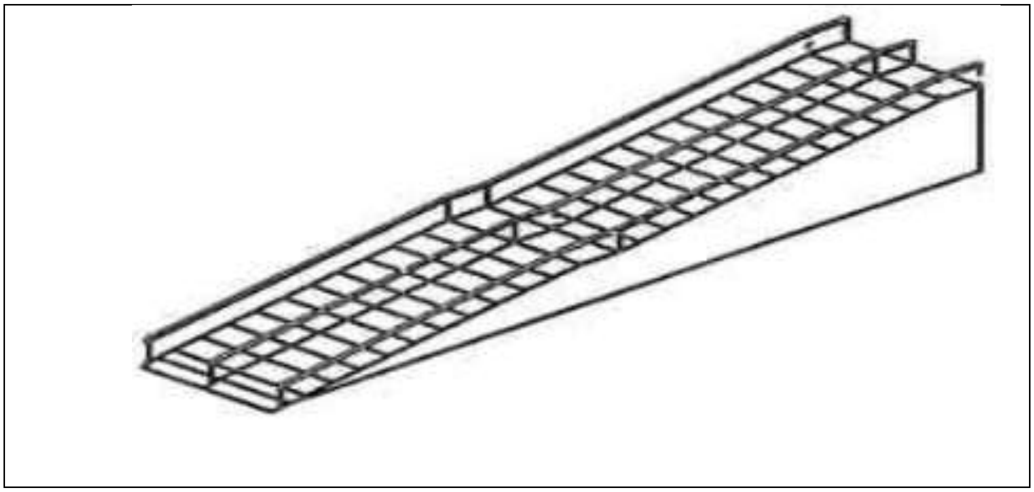

Figure 2.7: Protective handrail (Source: SOLIDERE 2004)

Whilst the ramp surface should be hard and non-slippery, carpets should be avoided. Mechanical ramps can be used in large public buildings but are not recommended for use by persons with physical impairments (Almahmond and Doloi, 2013). If the ramp is to be used by wheelchair-confined persons, the slope should not exceed 1:12. The maximum width should be 1.00 m to avoid slipping.

If the topography or structure of the existing building is restrictive, minor variations of gradient are allowed as a function of the ramp. As a safety measure, a non-slippery surface finish should be added to slippery ramps. Circular or curved ramps are therefore not recommendable.

2.8.2 Stairs

Stairs are needed in order to provide safe and well dimension staircases for the comfort of all people, especially those with mobility problems. In the design of stairs differences in level should be eliminated or minimized as much as possible for the comfort of disabled people. A complementary ramped route, elevator or lift should be provided where there are steps in an otherwise accessible path. All steps should be uniform whilst circular stairs and stepped landings should be avoided. Moreover, open risers are not recommendable impairments (Almahmond and

Doloi, 2013). The minimum width of a stairway should be 0.90 meters for one-way traffic and 1.50 meters for two-way traffic.

For indoor stairs, the riser should be between 0.12 m and 0.18 m, and the tread between 0.28 m and 0.35 m. For outdoor stairs, the maximum riser should be 0.15 m and the minimum tread should be 0.30 m impairments (Almahmond and Doloi, 2013).

An intermediate landing should be provided when the stairs cover a difference in level of more than 2.50 m whilst the length of the landing should be at least 1.20 m extending along the full width of the stairs impairments (Almahmond and Doloi, 2013).

In considering the nosing design, sharp edges and overhanging nosing should not be used for treads. Nosing should be flush or rounded and should not project more than 40 millimeters (mm) impairments (Almahmond and Doloi, 2013).

2.8.3 Elevators

In buildings that relate to elevators, problems identified are such that there are inadequate space inside the elevator cab with high position of switches, buttons and control panel. Furthermore, whilst there are narrow entry doors, the opening time interval is insufficient.

The principle behind the design and construction of elevators is to provide well- dimension elevators that disabled people can use conveniently. In the design construction, the accessible elevator should serve all floors normally reached by the public.

Key-operated elevators should be used only in private facilities or when an elevator operator is present, whilst wide elevator cabs are preferable to long ones. The minimum internal elevator dimensions, allowing for one wheelchair passenger alone, are 1.00 m x 1.30 m. The door opening should not be less than 0.80 m. This is illustrated in figure 2.8 below (Ojok, 2012).

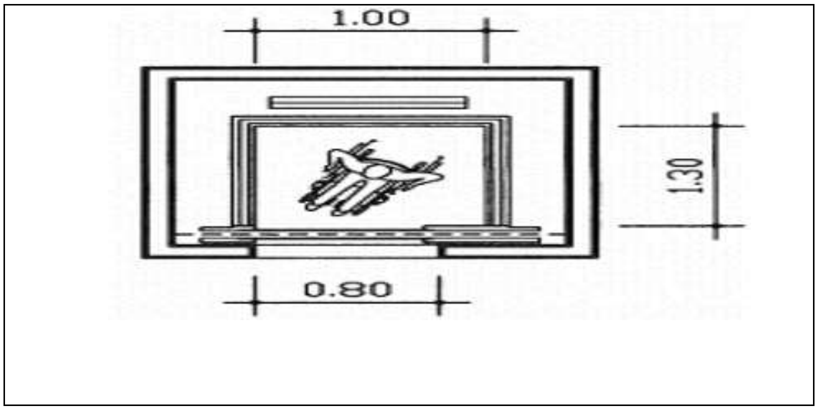

Fig 2.8: The minimum internal elevator dimensions (Source: SOLIDERE 2004)

The inside of the elevator should have a handrail on three sides mounted 0.80 to 0.85 m from the floor. For ease of reach, the control panel should be mounted 0.90 m to 1.20 m from the floor. The maximum tolerance for stop precision should be 20 mm as shown in the figure below 2.9 (Anyanwu, 2012).

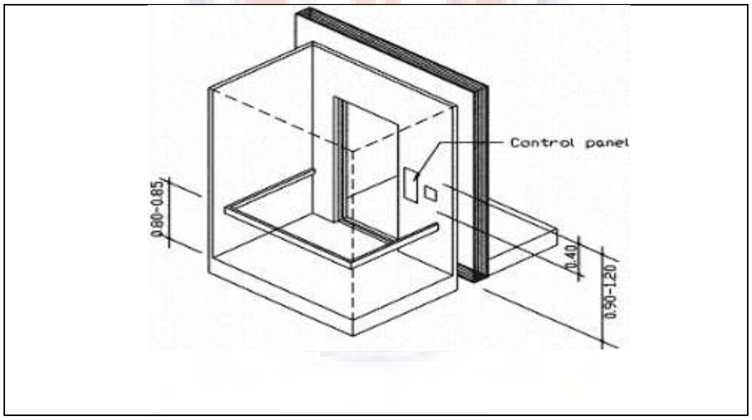

Figure 2.9 Height for mounting handrail inside elevator (Source: SOLIDERE 2004)

Control buttons should be in an accessible location and illuminated. Their diameter should be not smaller than 20 mm. The numerals on the floor selector buttons should be embossed so as to be easily identifiable by touch. For ease of reach, call buttons should be mounted 0.90 m to 1.20 m from the floor (figure 2.10) (Anyanwu, 2012).

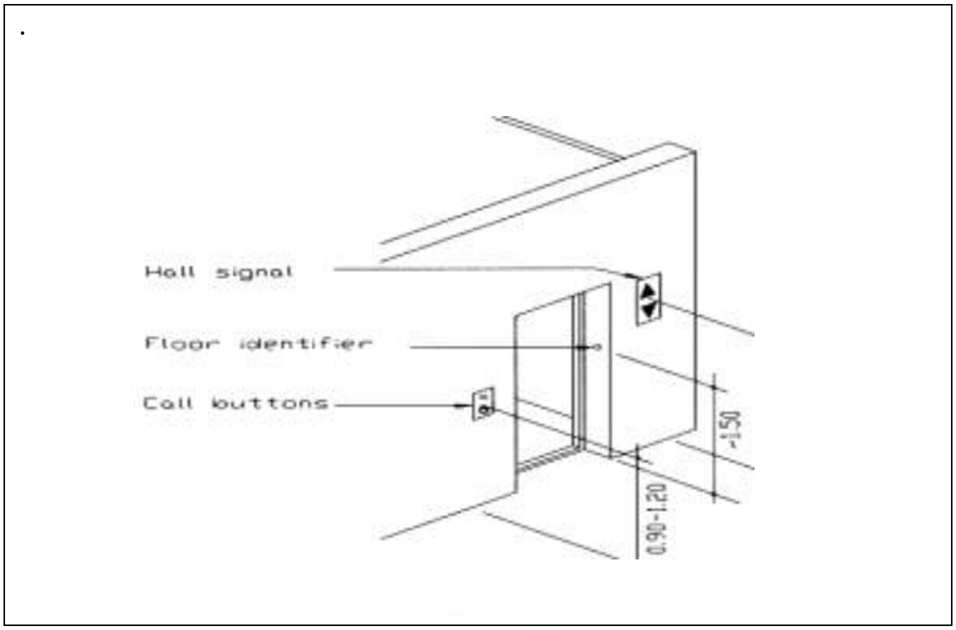

Fig 2.10: The height for mounting elevator hall signal and call button

(Source: SOLIDERE 2004)

The elevator hall signal should be placed at an approximate height of 1.80 m whilst the door opening interval should be no less than five seconds (Anyanwu, 2012).

Re-opening activators should be provided. The floor of the elevator and the area in front of the elevator on each floor should have a nonskid resilient surface or a low-pile fixed carpet.

2.8.4 Platform lifts

The following have been identified as problems encountered in buildings that relates to elevators: there are changes in level between indoor and outdoor areas, and in the level inside a building with insufficient space for ramps.

The planning principle behind the design of platform lift is to allow people with mobility problems to have free vertical access between different levels. Platform lifts can have either a vertical or an inclined movement. For maximum level changes of 2.50 m, vertical movement platform lifts may be installed adjacent to the stairs (figure 2.11) SOLIDERE 2004).

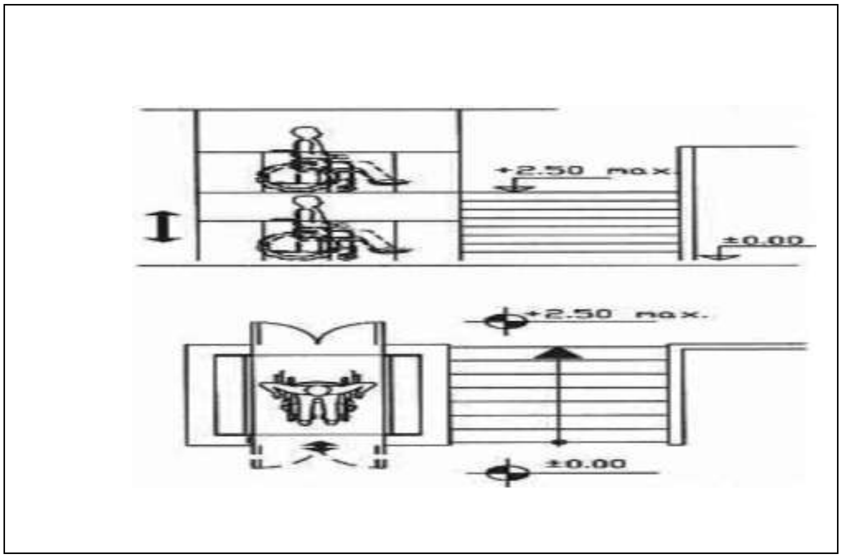

Fig 2.11: Vertical movement platform lift (Source: SOLIDERE, 2004)

For level changes of more than 1.20 m, the lift should be placed in a closed structure with doors at the different accessible levels (figure 2.12) (SOLIDERE, 2004). Vertical platform lifts can have a variety of opening for entry and exit (figure 2.12).

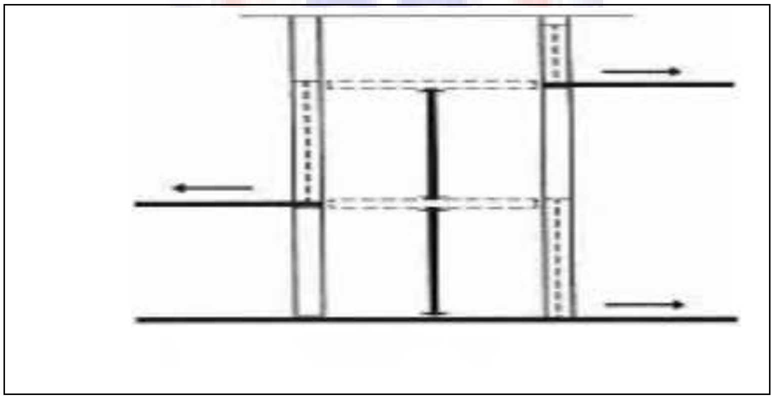

Fig 2.12: Lift placed in a closed structure with doors at accessible levels

(Source: SOLIDERE 2004)

Inclined movement platform lifts consist of three elements: a railing, an electric generator and a moving platform or seat. The operating system of the lift can be either lateral or suspended.

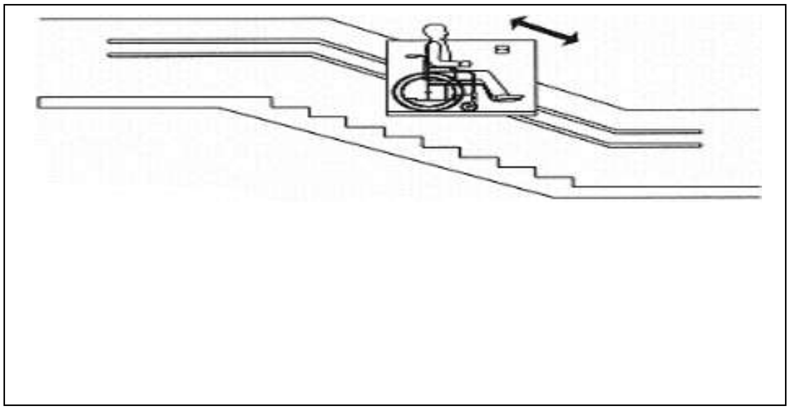

Fig 2.13: Lateral operating lift. (Source: SOLIDERE, 2004)

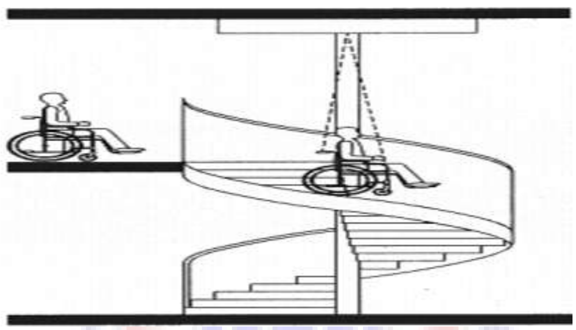

Figure 2.14: Suspended operating lift (Source: SOLIDERE 2004)

Inclined movement platform lifts can be installed along the stair wall, as long as they do not obstruct the required width of the exit. The seat or platform can be folded when not in use. The minimum width of the stairs should be 0.90 m to allow the installation of a lift SOLIDERE 2004)

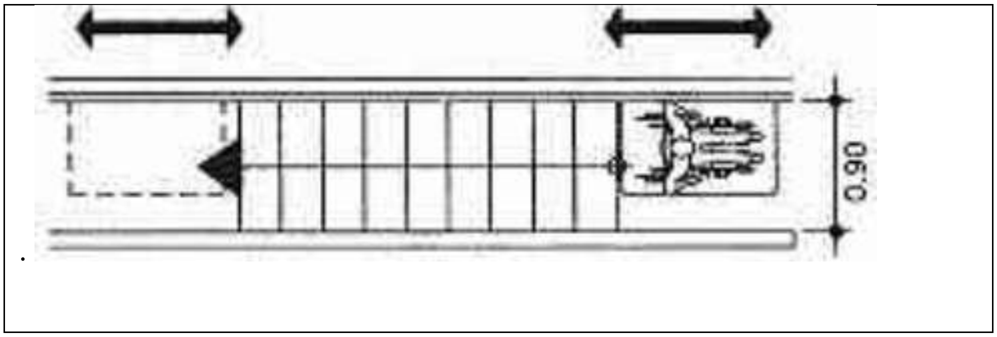

Fig 2.15: Inclined movement platform installed along a stair wall (Source: SOLIDERE, 2004)

Platform lifts can be installed on all types of stairs including switch-back stairs i.e. those with a rotation angle of 180 and spiral staircases.

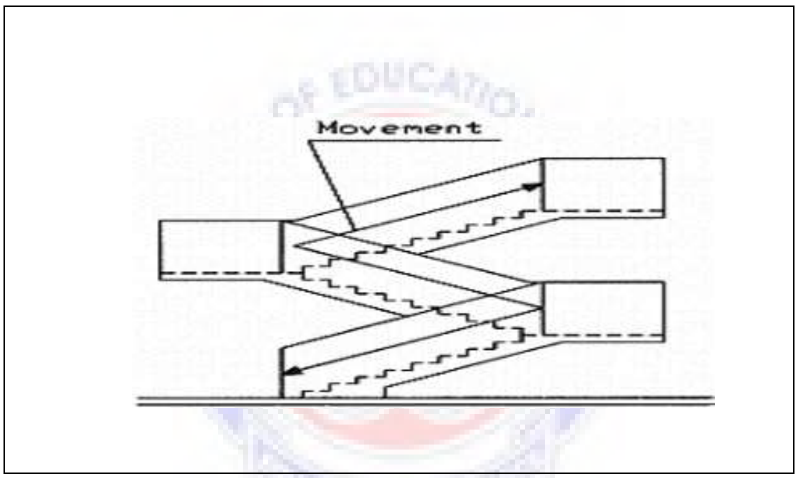

Fig 2.16: Switch-back stairs fitted with platform lifts (Source: SOLIDERE, 2004)

In terms of the size of the lift the minimum width of the lift platform should be 0.90 m and the minimum length should be 1.20 m.

2.8.5 Railings and Handrails

The following have been identified as problems encountered in buildings that relates to railings and handrails: they are characterized by unsafe railings, hard to grip handrails with no railings or handrails at all. In planning the design, the main principle concerning the design of rails and hand rail is to install adequate railing, wherever needed for the comfort and safety of all people, especially those with mobility problems.

Safety guards or railings should be installed around hazardous areas, stairs, ramps, galleries, balconies and raised platforms more than 0.40 m high. On stairways, windows positioned less than 1.00 m from the landing should have railings. Spacing between the vertical and horizontal bars of railings should be narrow for the safety of children. It should not obstruct the path of travel (Anyanwu, 2012).

In order to facilitate use by disabled and elderly people, handrails should be mounted between 0.85 m and 0.95 m above the finished floor level. For the benefit of wheelchair users, a second handrail can be mounted between 0.70 m and 0.75 m from the floor (Anyawu, 2012).

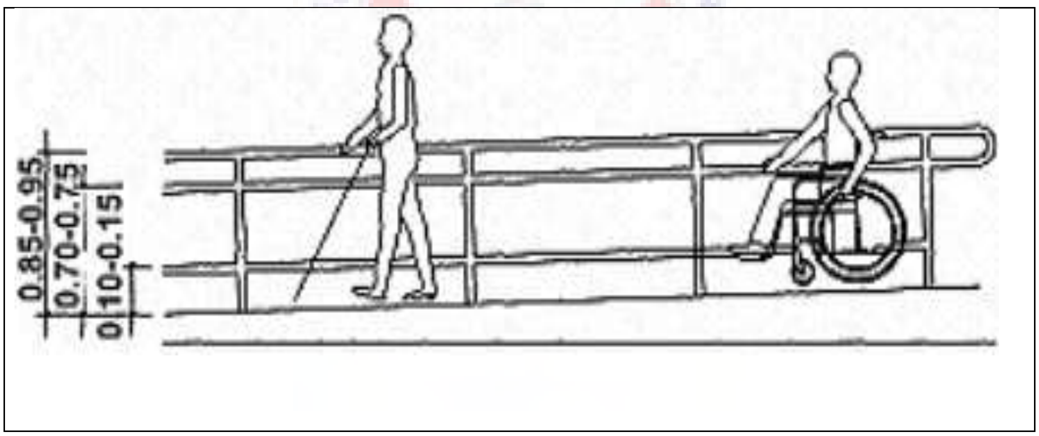

Fig 2.17: Appropriate height of hand rails for the disabled in general (Source: SOLIDERE 2004)

To facilitate use by children and short people, a third handrail can be mounted at a height of 0.60 m. To guide sightless people using a long cane, a rail should be mounted at a height between 0.10 m and 0.15 m or a low curb should be installed at a height between 50 mm and 75 mm. Low curbs also act as wheel stops (SOLIDERE, 2004).

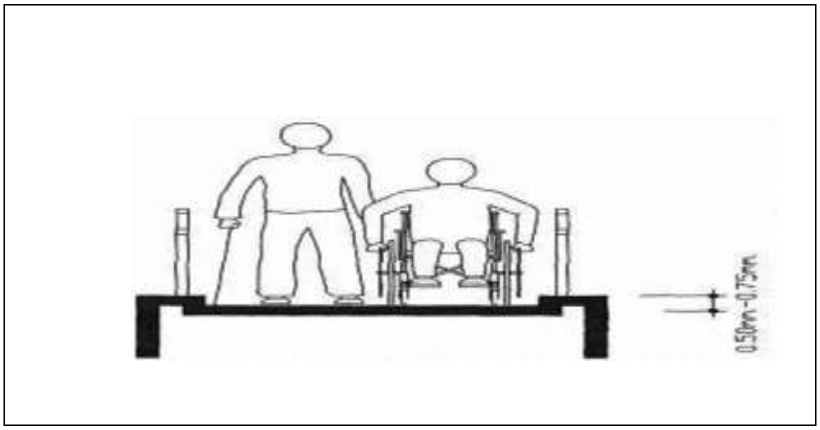

Fig 2.18: Low handrails and curb mounted to guide the disabled (Source: SOLIDERE, 2004)

Railings should be securely mounted and attached to the wall or to a supporting structure so as to withstand heavy loads. Railings should not end abruptly but extend to the floor or blend into the wall so as not to create a hazard for sightless people (Ojok, 2012).

Handrails should allow a firm and easy grip. Circular cross-sections with a diameter of 40 mm are preferable. Sharp edges should be avoided (Ojok, 2012).

Handrails should continue uninterrupted (except for doorways) on both sides and around the landing. It should extend horizontally for a distance between 0.30 m and 0.45 m at the top and bottom of stairs and ramps, except in places where extensions could obstruct the pedestrian flow (figure 2.19) (SOLIDERE, 2004) .

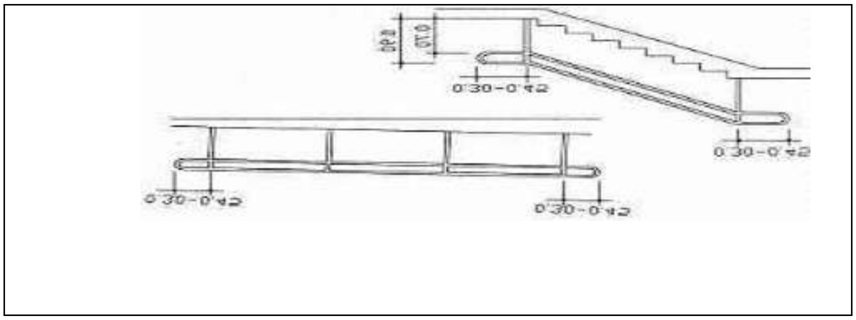

Fig 2.19: Hand rails fixed in a continuous nature (Source: SOLIDERE, 2004)

For stairs or ramps more than 3.00 m wide, a continuous intermediate handrail could be provided (see Ramps; Stairs) (SOLIDERE, 2004).

It has a wall-mounted handrail. The space between the handrail and the wall should be between 40 mm and 50 mm for smooth walls and 60 mm for rough textured walls (fig. 2.20).

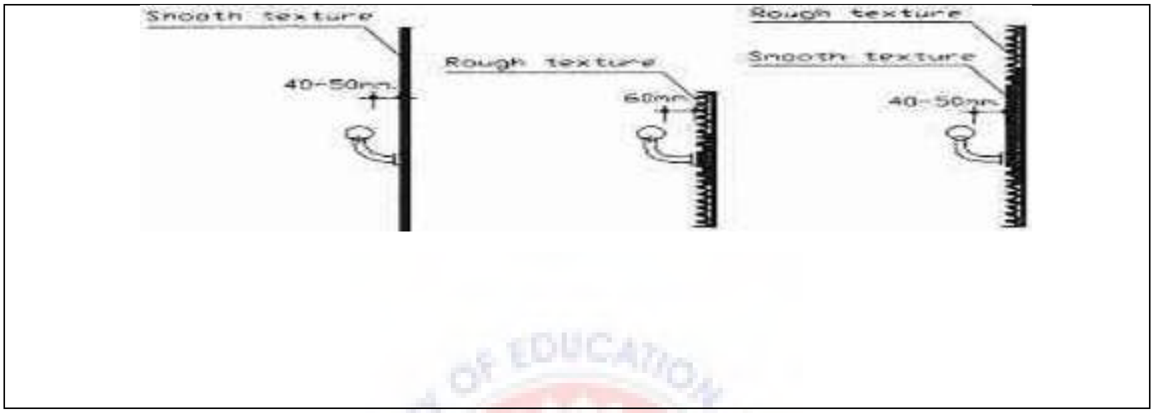

Fig 2.20: Fixing of handrails on walls (Source: SOLIDERE 2004)

In a more general way, entrance is an opening, a passage through which one enters something. It is a door, gate, portal etc. by which a building or area can be entered; the area or space in its immediate vicinity (Davies and Jokiniemi, 2008).

2.8.6 Entrances

The following are the problems identified with entrances: it mostly comes with no distinct accessible entrance with inadequate space in front of the entrance.

The principle behind the design of entrances is to provide accessible and easy-to-find building entrances. The design considerations for new accessible constructions building is that, all main public entrances should be accessible to an ambulant disabled person. At least one entrance per facility should be accessible to a wheelchair user. In new buildings, the accessible entrance(s) should be the main entrance(s) intended for use by the general public (SOLIDERE, 2004).

Each accessible entrance should be connected by accessible pathways to accessible indoor or outdoor parking areas, local public transit stops and drop-off areas (figure 2.21).

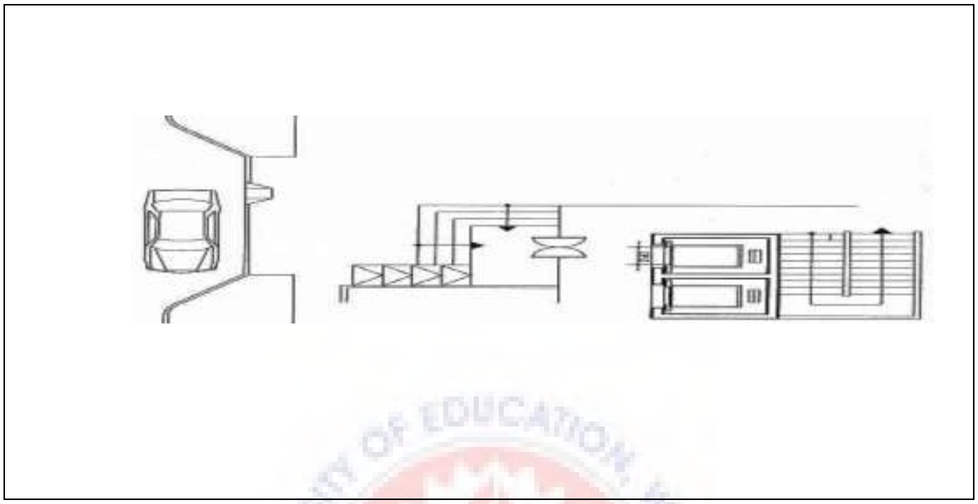

Fig. 2.21: Accessible main entrances (Source: SOLIDERE 2004)

In multi-storey buildings, the accessible entrance should permit access to a conveniently located accessible elevator or lift. Accessible entrances should be clearly identified using the international symbol of accessibility including alternate locations of accessible entrances (figure 2.22) (SOLIDERE, 2004).

2.22: Disables accessibility entrance signage. (Source: SOLIDERE, 2004)

Fig. 2.22: Disables accessibility entrance signage. (Source: SOLIDERE, 2004)

Where the entrance door opens outward, the minimum landing dimensions should comply with figure 2.23.

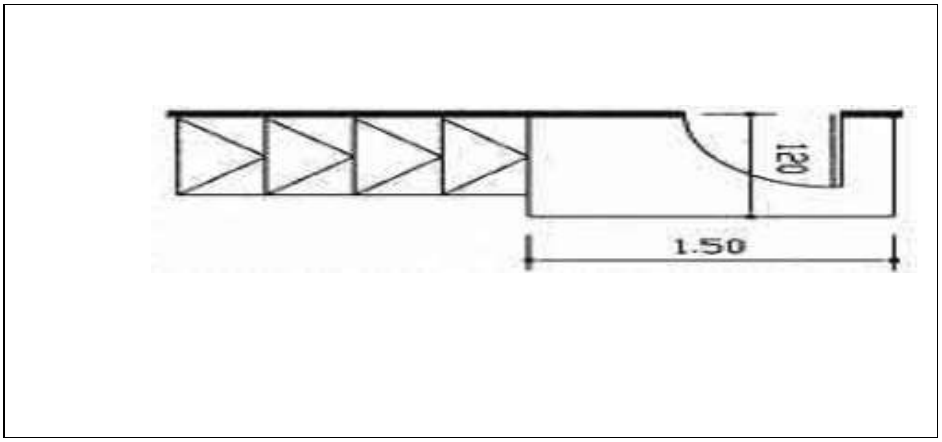

Fig 2.23: Entrance landing for door that opens outward (Source: SOLIDERE, 2004)

Where the entrance door opens inward, the minimum landing dimensions should comply with figure 2.24.

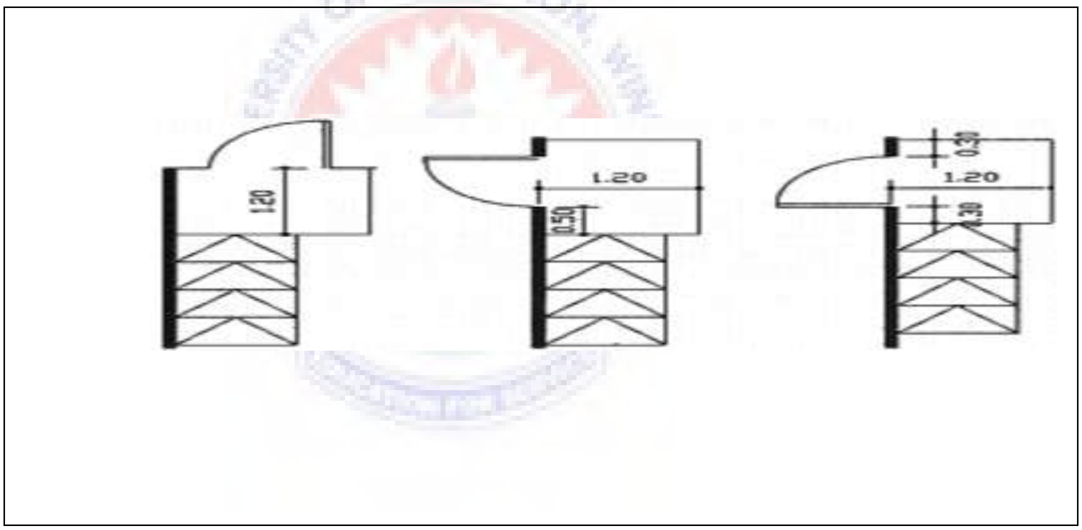

Fig. 2.24: Entrance landing for door that opens inward (Source: SOLIDERE, 2004)

The surface of the landing should have a slope of 2% for drainage (SOLIDERE, 2004) . The finish material should be non-slippery. Jute door mats should be avoided but when used however, the upper surface of the mat should be level with the floor finish.

Public buildings should have at least one accessible entrance. Wherever possible, this should be the main entrance intended for use by the general public as stated under Building Types.

If for architectural or technical reasons the main entrance cannot be made accessible, an alternative accessible entrance should be provided. The location of the alternative entrance should be clearly indicated by signs (SOLIDERE, 2004).

To allow for an accessible entrance, one of the following solutions can be adapted: Firstly, ramps, bridges or mechanical lifts may be used, or the entrance level might be modified with earth fill, or by changing the gradient or the landscaping of the surrounding site. Alternatively**,** for existing constructions, a service entrance can be used temporarily as an accessible entrance, but it should not be the only accessible entrance. Also, mechanical lifts are recommended for buildings where modifications are impossible or unacceptable (Kportufe, 2015).

2.8.7 Doors

Door is an opening in a wall with a hinged or sliding partition to allow access from one space to another (Davies and Jokiniemi, 2008).

Doors can be classed as external or internal. External doors are usually thicker and more robust in design than internal doors since they have more functions to fulfill (Hall and Greeno, 2006).

Difficulties are mostly encountered due to the presence of narrow doorways, doors hinged on the wrong side, thus hindering accessibility iii Doorways with high thresholds. iv Heavy and hard-to-operate door leaves (Davies and Jokiniemi, 2008)..

The principle underlining the design and construction of doors is to facilitate the passage of a wheelchair user through doors.

Accessible doors should be so designed as to permit operation by one person in a single motion with little effort. An accessible door should have the following features: a sign, a door handle, an extra pull handle, glazing and a kick plate (Davies and Jokiniemi, 2008).

Power-operated doors are the best for people with disabilities. The activator system should be automatic or placed within easy reach. Automatic doors are useful when traffic is heavy. Automatic doors should have an adequate opening interval. Guard-rails can be installed near double-swinging doors to indicate a door-opening area and to prevent people from being hit by the door. In general sliding doors are preferable to swinging doors (Anyawu, 2012).

For exterior doors, the minimum opening is 0.90 m when the door is open. For interior doors, the minimum opening is 0.80 m when the door is open (Davies and Jokiniemi, 2008). The minimum door opening can be 0.75 m if the access is straight or if the door can stay open by itself (figure. 2.25).

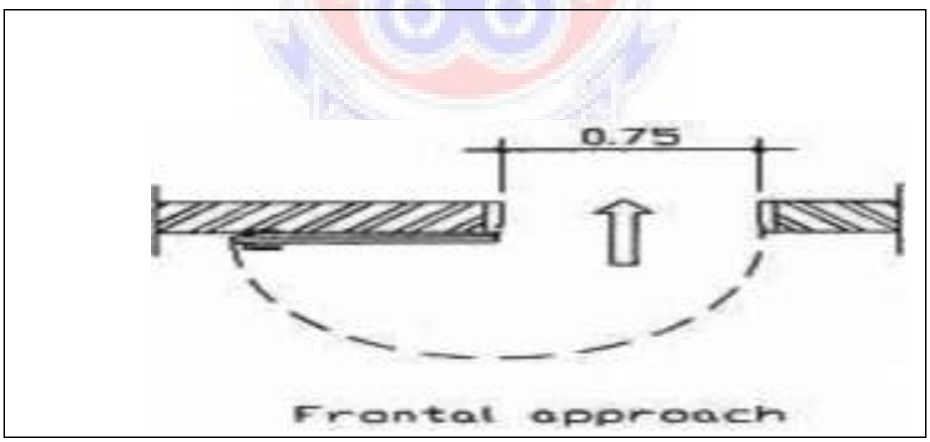

Fig 2.25; Minimum interior door opening size (Source: SOLIDERE, 2004

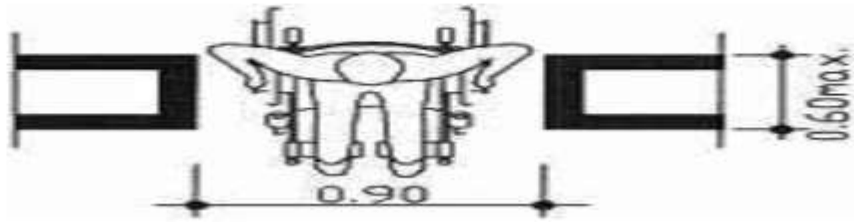

Fig. 2.26: Minimum exterior doors opening size (Source: SOLIDERE, 2004)

The minimum door width of rest rooms should be 0.75 m. For doors installed in an opening more than 0.60 m in depth, the clear door opening should be at least 0.90 m. For double-leaf doors, at least one leaf should have a minimum clear width of 0.80 m (figure 2.27) (Ojok, 2012).

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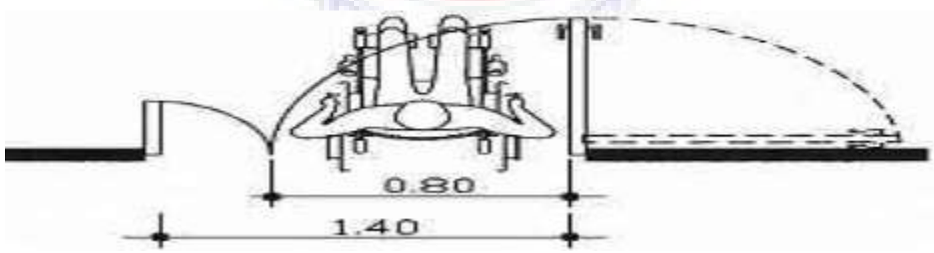

Fig. 2.27: Double-leaf door with one leaf of clear width of 0.80 m (Source: SOLIDERE, 2004)

It is mostly fitted with manual door hardware. Operational devices on doors, such as handles, pulls, latches and locks, should be easy to grasp with one hand.

Lever-type handles, push plates or pull handles are recommended for swinging doors because they are easy to open. Round knobs are not recommended. Door handles should be located at a comfortable height between 0.90 m and 1.00 m from the floor surface (Ojok, 2012).

Locks on entrance doors should be mounted at a comfortable height between 0.90 m and 1.00 m from the floor. To facilitate closing, a door fitted with spring closers should be equipped with an extra pull handle approximately 0.30 m in length, located between 0.20 m and 0.30 m from the hinged side of the door and mounted between 0.90 m and 1.20 m from the floor (Ojok, 2012).

Automatic doors can be activated by push buttons located at a comfortable height between 0.90 m and 1.20 m, activating mats which can also serve as a location cue, card-insert switch or remote control Thresholds should be omitted wherever possible. Weather-stripping at the door bottom is preferred to thresholds. The threshold should not be more than 20 mm higher than the finished floor level. Thresholds higher than 6 mm should be beveled or have sloped edges to facilitate the passage of a wheelchair (Ojok, 2012).

Whilst the exit landing should not be lower than the finished floor level by more than 20 mm, kick plates are useful in protecting the finish on the lower part of the door. Kick plates should be between 0.30 m and 0.40 m in height (Anyanwu, 2012).

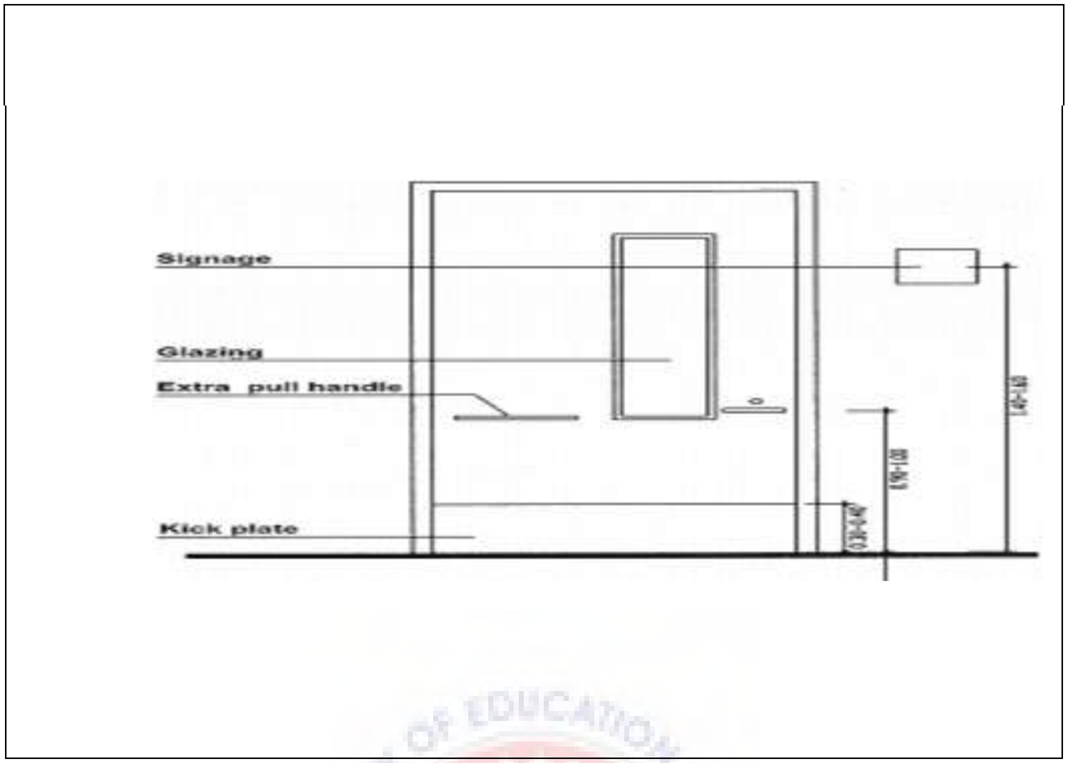

Fig. 2.28: A typical disability friendly door with all required features (Source: SOLIDERE, 2004)

Outward swinging doors and doors in public corridors should have low windows to enable users to see oncoming traffic. The bottom edge of the window should not be higher than 1.00 m from the finished floor level (Davies and Jokiniemi, 2008).

Completely glazed doors should be avoided in buildings frequented by people with visual impairments. Glazed doors should be clearly marked with a colored band or mark placed for the benefit of all users at a height between 1.40 m and 1.60 m (Davies and Jokiniemi, 2008).

In public buildings, the function or room number, incorporating international symbols should be identified at eye level, i.e. between 1.40 m and 1.60 m. Room numbers should be placed on door frames and not on doors themselves so that the room number is visible even when the door is open (Davies and Jokiniemi, 2008) .

2.8.8 Corridors

Corridor is a long narrow passage from which doors open into rooms. Another definition also states that it is a narrow longitudinal circulation space within a building providing internal access to rooms or other spaces (Davies and Jokiniemi, 2008).Long and narrow corridors creating orientation difficulties have been the difficulty pertaining to the use of corridors by disabled persons.

The design principle for corridors is to provide well-dimensioned corridors to facilitate the passage and maneuvering of a wheelchair.

Wide corridors are useful for wheelchair users, crutches users, parent with a pram, service equipment, high traffic areas,

The unobstructed width of a low-traffic corridor should not be less than 0.90 m. This also allows maneuverability in 90 turns (figure 2.28) (Davies and Jokiniemi, 2008).

The unobstructed width of a public corridor should not be less than 1.50 m. The recommended width is 1.80 m (figure 2.29).

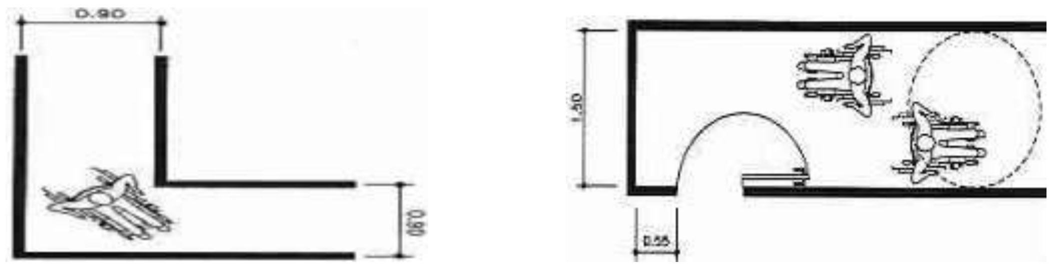

Fig. 2.29: Low-traffic corridors and   Fig. 2.29 Public corridors (Source: Davies and Jokiniemi, 2008)

According to Davies and Jokiniemi (2008) the corridor width should allow maneuverability through the doors located along its length.

Obstacles protruding into the corridor, such as drinking fountains or public telephones, should be placed outside the circulation path, in alcoves or cul-de-sacs (figure 2.30).

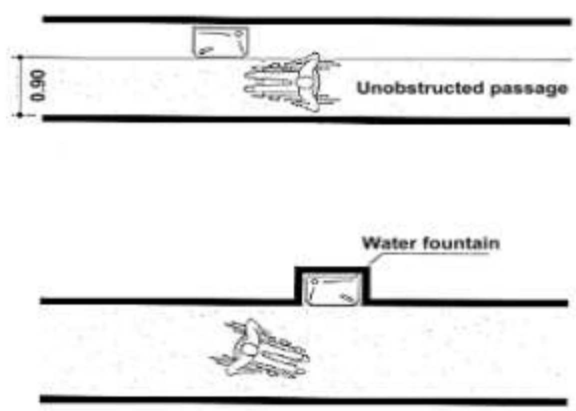

Fig. 2.30: Unobstructed corridors (Source: Davies and Jokiniemi, 2008)

Changes in the surface level of more than 13 mm should be ramped. Floor surfaces should be non-slip and even. Carpets should be securely fastened (Salmi, 2008).

2.8.9 Parking Areas

Problems identified with buildings include poor parking facilities with insufficient width of the parking aisle. It is also characterized by no allocation of parking space for the disabled. Parking facilities should be accessible as close as possible to the point of destination.

Making parking provisions accessible applies to both outdoor and underground facilities. For multi-storey indoor parking facilities, at least one level should be served by an accessible elevator, but for parking facilities of less than 50 cars, at least one accessible parking space should be provided in every parking facility (Davies and Jokiniemi, 2008).

For parking facilities of a maximum number of 400 spaces, accessible parking spaces should at least be provided in the ratio of 1:50 (one accessible space for every 50 spaces). For parking facilities of more than 400 spaces, at least 8 accessible parking spaces should be provided plus 1 space for each additional increment of 100 cars over 400 (Salmi, 2008).

For outdoor parking, accessible parking spaces should be located not more than 50 m from accessible building entrances, but for indoor parking, accessible parking spaces should be located right next to accessible elevators, or as close as possible to exits.

The minimum width of an accessible parking space is 3.60 m. The recommended width is 3.90 m. An access aisle 1.20 m wide can be located between two ordinary parking spaces. If curb exists, curb ramps should be provided to link accessible parking spaces to accessible pathways (Salmi, 2008).

The surface of a parking facility should be uniform and smooth whilst the slope of a parking ramp should not exceed 1:20. Accessible parking areas should be marked by the international symbol of accessibility. If the parking area is more than 50.00 m from the building entrance, a vehicular drop-off area within 30.00 m of the entrance should be built or an accessible parking space close to the entrance should be constructed (Davies and Jokiniemi, 2008).

According to Salmi (2008), if no accessible parking space is available, one of the following measures should be implemented:

(a) Block a peripheral regular stall with bollards to get one accessible parking space

(b) Block a central regular stall with bollards to get two accessible parking spaces

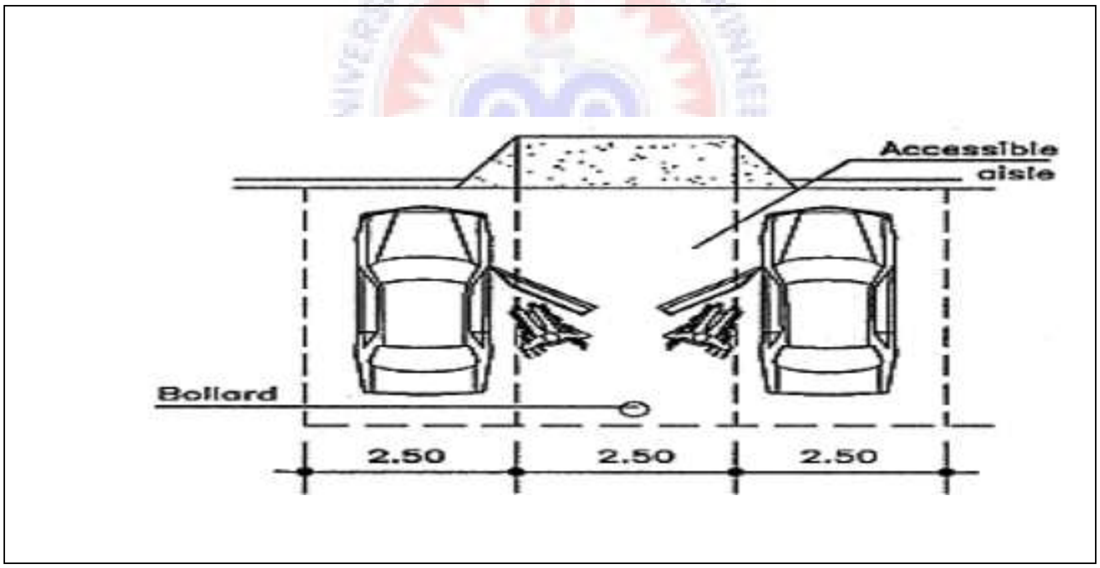

Fig 2.31 Two accessible parking space (Source: Davies and Jokiniemi, 2008)

2.9 Concept of Inclusive Environment

An inclusive environment is one that addresses the needs of all individuals taking into consideration the diversity in human nature. An inclusive environment is more than ensuring an accessible building, providing a sign language interpreter or creating large print documents

(Anyawu, 2013). It is more than refraining from illegal interview questions or violating confidentiality. Rather, an inclusive service environment welcomes all people, regardless of their disability. It recognizes and uses their skills and strengthens their abilities. According to Ojok (2012), an inclusive environment is respectful, supportive and equalizing and reaches out to and includes individuals with disabilities at all levels. In an inclusive environment, the first considerations are ensuring access, opportunity, independence and dignity and not cost or inconvenience. The following are concepts that are geared towards an inclusive environment:

2.9.1 Universal Design

Access to communities and activities is of vital importance to all members of a community—including those with disabilities (Davies and Jokiniemi, 2008). In increasing numbers, people with disabilities of all types are living and working in community settings and accessing the goods and services available there. Since community settings must accommodate an increasingly diverse population, it is critical that they be designed to be as inclusive and universally accessible as possible, addressing the requirements of a wide range of physical, sensory, and cognitive abilities and needs."(Salmi, 2008)

Universal design refers to broad-spectrum of ideas meant to produce buildings, products and environments that are inherently accessible to both people without disabilities and people with disabilities.

The term "*universal design*" was coined by the architect Ronald L. Mace to describe the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life (Davies and Jokiniemi, 2008). However, it was the work of Goldsmith, (1963), who really pioneered the concept of free access for disabled people. His most significant achievement was the creation of the dropped curb - now a standard feature of the built environment.

Universal design emerged from slightly earlier barrier-free concepts, the broader accessibility movement, and adaptive and assistive technology and also seeks to blend aesthetics into these core considerations (Goldsmith, 1963). There are many industries in which universal design is having strong market penetration but there are many others in which it has not yet been adapted to any great extent. Universal design is also being applied to the design of technology, instruction, services, and other products and environments.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the overall methodology of the study. It takes into account the study area, the research design, the study population, sampling and data collection and data analysis.

3.3 Research Design

A descriptive survey design with both quantitative and qualitative approaches was used by the researcher to undertake the study. This type of designs mostly adopted in cases where the study aims at describing the characteristics of identifiable variables and groups (Creswell, 2009). It is highly appreciated where the study seeks to make predictions on the outcome of certain dependent variables. Additionally, since the study sought to test certain hypothesis, a quantitative approach was adopted to study the relationship the dependent and independent variables of interest (Creswell, 2008). Furthermore, the researcher was also interested in controlling subjectivity and its attendant biases.

3.4. Population

The target population comprised all built-environment professionals within the Kumasi Metropolis. These included project managers, architects, planners, engineers and other professionals who matter in the area of the built-environment industry. These respondents represented both private and public organizations i.e. the Ghana Institute of Planners (GIP), Ghana Institute of Architects (GIA), Ghana Institute of Engineers (GhIE), Kumasi Metropolitan Assembly (KMA), Public Works Department (PWD) and public health facilities and tertiary institutions in the study area.

3.5 Sampling Techniques and sample Size

This study adopted both probability and non-probability sampling techniques. Owing to the heterogeneous nature of the study population, a stratified random sampling was used to collect quantitative data from the various professionals within the built-environment industry. This was done in order to obtain a sample which will be a representation of the total population. Non-probability sampling was used to purposively select management personnel and planners from the public health facilities and tertiary institutions, and KMA.

A sample size of one hundred and four (104) respondents was selected for the study.

Table 3.1 Distribution of Respondents Selected

Participants	**Respondents selected**
Project managers	20
Architects	22
Engineers	27
Planners	15
Management personnel	20
Total	**104**

3.6 Data collection Instrument

The researcher used questionnaires, interview guide and observations for collecting both quantitative data and qualitative data. The use of interview and observation helped to obtain in-depth information to complement the data from the questionnaire..

3.6.1 Questionnaire

Questionnaire was administered to the built-environment professionals within the Kumasi Metropolis. The questionnaire was designed to contain a range of mostly closed-ended questions with a few open-ended questions. It was prepared under three sections i.e. Sections A, B and C. Section A of the questionnaire covered demographic information. Among the issues raised in Sections B, and C dealt with level of compliance with built-environment requirements of Disability Act, constraints to the compliance with built-environment requirements of the Disability Act, 2006.

3.6.2 Interview

A series of face to face interviews were conducted in order to acquire in-depth information from management personnel and planners who form integral part of the decision-making bodies of their organizations. Interview guide was used to regulate the series of questions posed. The nature of questions asked covered issues relating to the constraints to compliance with the built-environment requirements of the Disability Act, 2006. The interview guide is shown in the appendix.

3.6.3 Observation

In this study, the researcher observed the real situations regarding compliance to built-infrastructure requirements of the Disability Act, 2006 in some selected public buildings in the Kumasi Metropolis. The researcher visited government ministries and departments, Adum Post Office, Kwame Nkrumah University of Science and Technology (KNUST), University of Education, Winneba, Kumasi (UEW-K), Technical University (KsTU) , Komfo Anokye Teaching Hospital (KATH) and Suntreso Government Hospital. Focus was placed on observing the availability of such facilities as doorways, ramps, stairways, flooring, and wheel chair pathways and so on.

3.7 Data Analysis

Descriptive statistics such as mean percentages and frequency tables were used to summarize the demographic variables. The level of compliance to the built-infrastructure requirements of the Disability Act, 2006 was analyzed with using a likert scale. A logit regression model was used to analyze the level of compliance to the built-infrastructure requirements whilst Kendall Co-efficient of Concordance **(*W*)** was used to rank the constraints to compliance to the built-infrastructure requirements of the Disability Act, 2006.

Thematic analysis was also used to analyze the qualitative gathered through interviews.

Conceptual Model

In order to estimate the level of compliance to built-environment provisions of the Disability Act (2006), a simple linear regression model was employed. The conceptual model of the study is expressed as;

$$= c + \square\square(\boldsymbol{X}) + \square$$

Where = dependent variable

c = intercept (constant)

□□□□□□□□□□□□□□□□= slope (regression coefficient)

X = independent variable

□□□□□□□□□□□□□□ = error term

Specification of the empirical model

=□c + □□□***SZEORG***□□+ □□□***INDEXP***□□+ □□□***YEAEDU***□□+ □□**(*INCENCOMP*)** +

□□□***POLCOM)*** + □□□***KNODISACT***□□+ □

Definition, measurement of variables and a-priori expectations

Dependent variable: - The dependent variable is a continuous variable. The level of compliance i.e. the dependent variable was measured on a four point Like scale ranging from 1 (Very high) to 4 (very low).

SZEORG: - The size of the organization is a dummy variable. “1” was used to represent large size organization and “0” for otherwise. The apriority expectation is either positive.

INDEXP: - The industry experience of the respondent is a continuous variable and it was measured by the number of years they have been working in the industry. The experience of the respondent is expected to have a positive effect on compliance to the built-environment provisions of the Act.

YEAEDU: - The number of years of the respondent’s education is measured by the years spent in formal education and it is a continuous variable. A professional with more years of formal education is expected to have knowledge and understanding of complying with the built-environment provisions of the Disability Act (2006).

***INCENCOMP*: -** Incentive for compliance was measured as a dummy variable. “1” was used to represent incentive for compliance and “0” for otherwise. It was expected that incentive for compliance should positively affect compliance to the built-environment provisions of the Act.

POLCOMP: - Policy of compliance was measured as a dummy variable where "1" represented the existence of a policy of compliance and "0" for otherwise. The expectation is that a policy of compliance will have a positive relation with the level of compliance.

KNODISACT: - Knowledge of the Disability Act by the built-environment professionals was treated as a dummy variable where "1" was used for respondents who had knowledge of the Disability Act and "0" for otherwise. The apriority expectation is positive.

3.8 Ethical Considerations

Permission was sought from the administration of the various stakeholder groups and the purpose of the research was clearly stated before field work was undertaken. A letter from the Department of Wood and Construction Technology was submitted to the administrative heads before observations and interactions with the built-environment professionals were started.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter discusses the results obtained from the questionnaires, interviews and observations.

4.2 Results of Questionnaire

The results of questionnaires were obtained from project managers, architects and engineers.

4.2.1 Results of questionnaire from project managers within the Kumasi Metropolis

As shown from the Table 4.1, majority of the project managers within the study area were males (17) who constituted 85% with only 15% being females (13). This implies that males are dominating the project management profession as compared to the females. This result is a confirmation of the assertion that there are fewer females than males in the area of construction project management Ojok (2012).The reason being that women are more inclined to lead a group of women than groups dominated by men.

The study found that, the bulk of the project managers were 8 representing 40% between 25-29, whilst 5 of them representing 25% were 50+. The results further indicated that 4 project managers who represented 20% fell between ages 30-39. The remaining 2 and 1 fell between ages 18-24 and 40-49 constituted 10% and 5%, respectively. Kulik *et al*., (2014) mentioned the need to redefine how we refer to experience and age as interchangeable attributes because we have an older and more diverse workforce.

As shown on Table. 4.1, 11 of the project managers representing 55% in the study area indicated that the size of the organization they represent were large whilst the remaining 9 forming 45% indicated that they represent small/medium size organization. This is the case largely because majority of the project managers sampled represented various government departments. These departments as their activities are mainly financed by the government and have the capacity to expand and operate on a large scale. This support Gould *et al.,* (2009) assertion that, an organization should choose the minimum number of management levels consistent with its goals and the environment in which it exists. Each hierarchical level created should add value since it provides additional decision making level in the organization

Sixteen (16) of the project managers representing 80% revealed that there was no policy of compliance within their organization whilst the remaining 4 (20%) indicated that there existed a policy of compliance to the built-infrastructure requirements of the Disability Act in their organization. Danso *et al.,* (2012) bemoaned that, as a nation, Ghana therefore does not have a policy framework that regulates and obliges the stakeholders in the building industry to design and build structures that are disability-friendly. This implies that project managers are least bothered about the construction of disability-friendly environment. This was a shocking revelation as it was expected of managerial personnel to push for policy that may compel the implementation of the built-infrastructure requirements of the Disability Act.

The results further showed that 3 project managers representing 15% responded that the organization they represent provided incentives for compliance to the built-infrastructure provisions of the Disability Act in Ghana as against the 17 respondents who formed 85% indicated that the organization they represent has no provisions in place to offer incentives for compliance to the Act. This supports Sher (2004) assertion that organizations have to rethink their policies which aim to integrate people with disabilities into the labor force, including how financial incentives are used to improve the participation of the disabled. This is an indication that project managers are not much encouraged to show compliance to built-infrastructure requirements of the Disability Act. The reason being that budgetary allocation to their departments is woefully inadequate, as revealed by the study results.

The results indicated that 19 project managers representing 95% responded that they had full knowledge about the existence of the Disability Act but the remaining 1 (5%) indicated that they do not have knowledge of the existing Disability Act which was passed in 2006 by the parliament of Ghana. This is in line with Hussin and Omran (2009) assertion that project managers are endowed with expert knowledge thereby giving them the professional edge to undertake and determine pricing of labor materials and other requisite construction resources. This is no surprising as it is expected of managerial personnel to acquaint themselves such important developments of national proportions as the introduction of the Ghana Disability Act.

The average number of years spent in formal education by project managers was 15 years whilst the average industry experience of the project managers was almost 18 years, whilst 2 and 21 were recorded as the respective minimum and maximum industry experience. The implication is that averagely a project manager has completed university education and is wealthy in professional experience. (Kent et al, 2010) asserted that the industry experience of built-environment professionals has a great effect on the level of compliance to the built-infrastructure requirements of the Disability Act. Professionals with more working years have the depth of experience and are more concerned with professional ethical standards. Again, Professionals with high level of formal education tend to upgrade and reinforce their skills and expertise to keep pace of the changing needs of societal circumstances (Salmen, 2001).

It is however surprising that despite their educational levels and depth of experience, they have done very little to enforce compliance to the built-infrastructure requirements of the Ghana Disability Act.

Table 4.1 Demographic variables of the project managers

Variables	Frequency	Percentage	Mean
Sex			
Male	17	85	
Female	3	15	
Age			
18-24	2	10	
25-29	8	40	
30-39	4	20	
40-49	1	5	
50+	5	25	
Size of organization			
Large	11	55	
Small/medium	9	45	
Policy of compliance			
Yes	4	20	
No	16	80	
Incentive for compliance			
Yes	17	85	
No	3	15	
Knowledge of Disability Act			
Yes	19	95	
No	1	5	
Average years of formal education	15		
Average years of industry experience			18

(Source: Field survey, 2018)

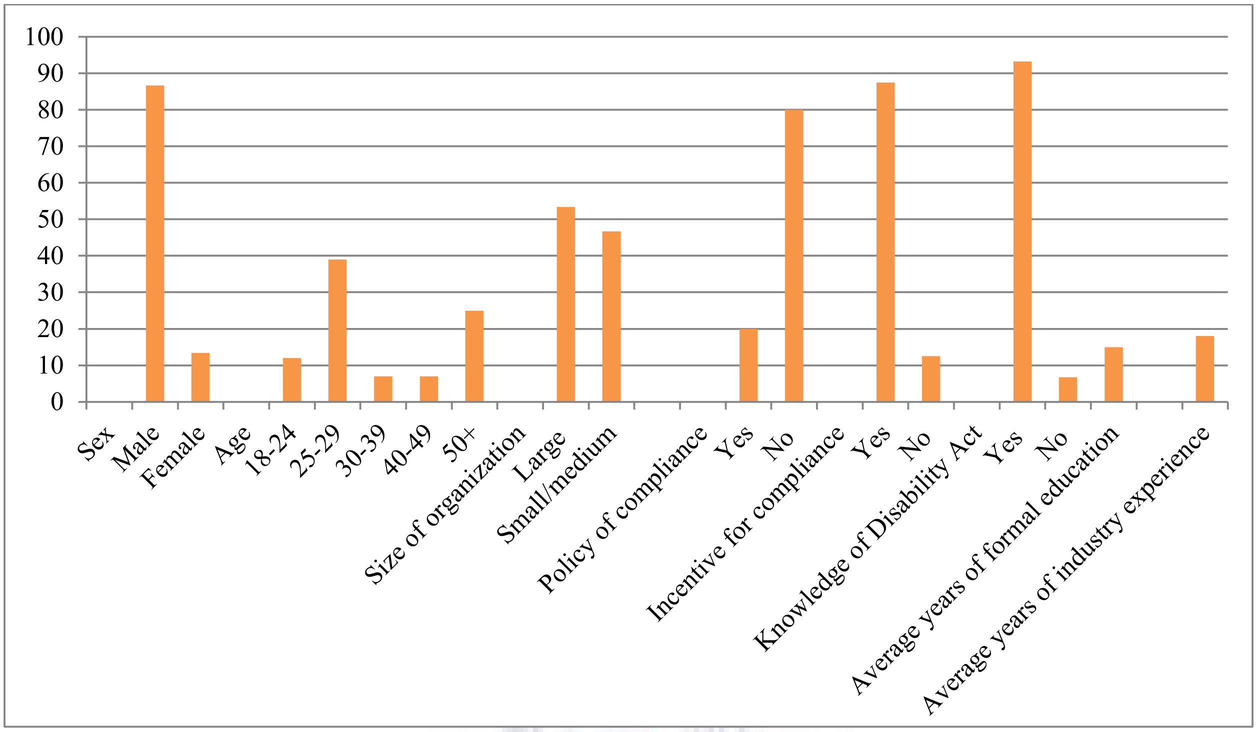

Fig. 4.1 Demographic variables of the project managers (Source: Field survey, 2018)

4.2.2 Results of questionnaires from Architects within the Kumasi metropolis

As indicated on Table 4.2, 12 of the architects representing 54% males and the remaining 10 (45%) being female. This implies that majority of the architects were males. This result is further confirmation of the assertion that there are fewer females than males in the area of construction project management Ojok (2012). This confirms the reality that the architectural profession is male dominated. The reason being that, women are less interested in venturing into job areas relating to construction and its related professions.

7 (33%) of the architects forming fell between the ages 40-49 followed 5 (23%) between ages 25-29. Four (4) (18%) were within the ages 30-39 and 50+. Only 2 of the architects representing 9% fell between ages 18-24. This reinforces what Kulik *et al*., (2014) found on the

need to redefine how we refer to experience and age as interchangeable attributes because we have an older and more diverse workforce.

The implication is that the bulks of the architects are in their youthful age and is able to exhibit a high level of energy in discharging their day to day activities.

The result also showed that, 15 architects (68%) represented small/medium sized organizations whilst the remaining 7(32%) represented large sized organizations. This is in contradiction the assertion made by (Albu & Albu, 2012) that Large size organizations tend to have the capacity to generate funds to finance productive activities and are mostly socially responsible. The implication is that majority of the architects sampled represented private outfits which tend to operate on small/medium scale as such organizations do not have the capacity to expand their scale of operation.

As shown on Table 4.2, 12 architects representing 54% indicated that the organizations they represent had no policy of compliance to the built-infrastructure requirements of the Disability Act, 10 of them representing 45% responded that their organizations had policy of compliance to the built-infrastructure requirements of the Disability Act. Danso *et al.,* (2012) called the for Ghana to not have a policy framework that regulates and obliges the stakeholders in the building industry to design and build structures that are disability-friendly This means that the bulk of the architects especially those operating in their private capacities are under some administrative directions to enforce compliance to the built-infrastructure requirements of the Disability Act.

21 (95%) of the architects responded that there is no existing incentive for employees to encourage compliance to the built-infrastructure of the Disability Act whereas only 1 respondent representing 5% indicated that there existed a mechanism of incentive to promote compliance to

the built-infrastructure requirements of the Act. Large size organizations tend to have the capacity to generate funds to finance productive activities and are mostly socially responsible (Albu & Albu, 2012).The implication of this is that, small/medium scale organizations where most Architects operate tend to spend their budgetary allocations on items that are aimed at maximizing profit rather than its welfare implications.

Similarly, twenty-one architects constituting 95% indicated that they had knowledge of the Disability Act whereas only 1(6%) respondent noted that they had no knowledge of the Disability Act. This implies that majority of the architects are aware of national developments. It is surprising why the overwhelming majority of the architects impute this knowledge of the built-infrastructure requirements of the Disability Act into their activities.

The results showed that architects averagely have spent 11 years in school whilst their average industry experience was 8 years. The industry experience of built-environment professionals has a great effect on the level of compliance to the built-infrastructure requirements of the Disability Act. According to (Kent et al, 2010), professionals with more working years have the depth of experience and are more concerned with professional ethical standards. Again, experienced professionals may show high level of compliance to the built-infrastructure requirements of the Disability Act, unlike the less experience counterparts.

Quite related to the industry experience, is the level of formal education of the built-environment professionals. Professionals with high level of formal education tend to upgrade and reinforce their skills and expertise to keep pace of the changing needs of societal circumstances (Salmen, 2001). This means that the average architect completed a tertiary institution or obtained a diploma. Even though, most of the architects were in their youthful age, they had enough experience and formal education.

Table 4.2 Demographic variables of Architects

Variables	Frequency	Percentage	Mean
Sex			
Male	12	54	
Female	10	45	
Age			
18-24	2	9	
25-29	5	23	
30-39	4	18	
40-49	7	32	
50+	4	18	
Size of organization			
Large	7	32	
Small/medium	15	68	
Policy of compliance			
Yes	10	44	
No	12	56	
Incentive for compliance			
Yes	1	5	
No	21	95	
Knowledge of Disability Act			
Yes	21	95	
No	1	5	
Average years of formal education		11	
Average years of industry experience		8	

(Source: Field survey, 2018)

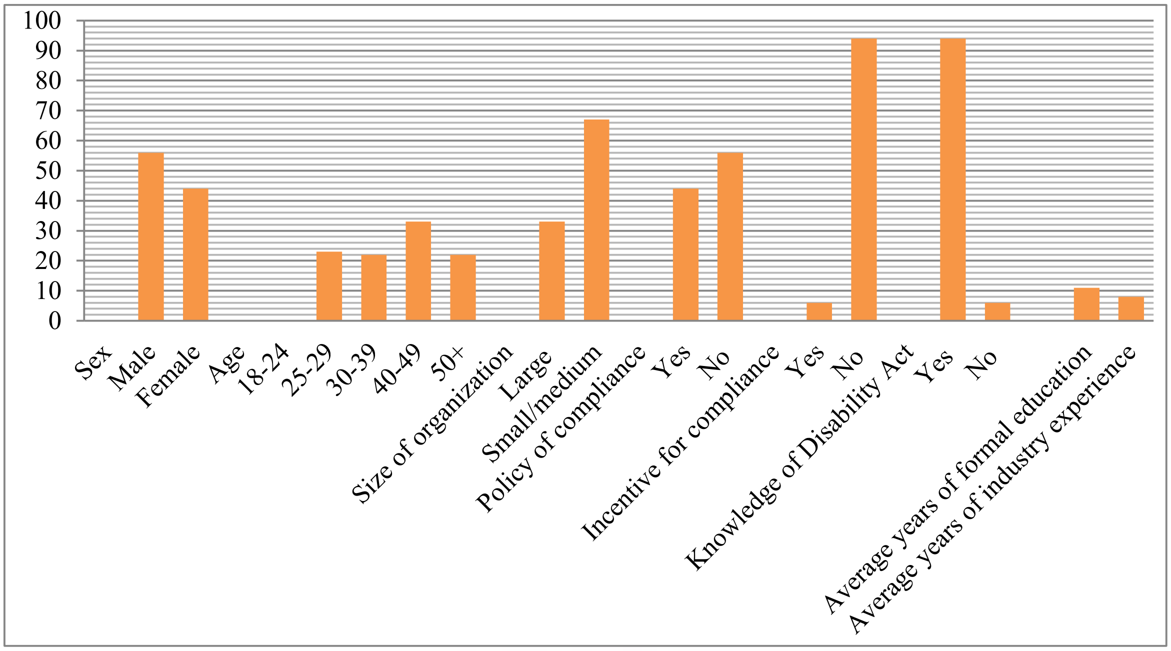

Fig. 4.2 Demographic variables of Architects (Source: Field survey, 2018)

4.2.3 Results of questionnaires from engineers within the Kumasi Metropolis

As shown on Table 4.3, 21 of the engineers (78%) were males with only 6 (22%) females. The bulk of the engineers were males as compared to females. This is not a surprising phenomenon as the engineering class in the Ghanaian society is dominated by men. This result further confirms the assertion that there are fewer females than males in the area of construction project management Ojok (2012).The reason being that women are more inclined to lead a group of women than groups dominated by men. This stems from the fact that the field of engineering tends to be perceived as an exclusive preservation of men.

Eight (8) engineers who represented 30% were between 40-49 years, whilst 7 of them representing 26% were between 30-39 years. Five (5) engineers representing 18% fell between the age group 25-29 and only 4 who made up 15% were between ages 18-24. Only 3 of them who formed 11% were 50+. This reinforces what Kulik *et al*., (2014) found on the need to redefine how we refer to experience and age as interchangeable attributes because we have an older and more diverse workforce.

As indicated on Table 4.3, 14 engineers who made up 52% indicated that they represented large size organizations whilst 13 of them constituting 48% were from small/medium size organizations. This implies that representation of the engineers in the sample was balanced. This could be reason that half apiece belonged to private entities and public organizations.

Whilst 18 engineers representing 67% indicated that the organizations they represent had no policy of compliance to the built-infrastructure requirements of the Disability Act, 9 of them forming 35% responded that their organizations had policy of compliance to the built-infrastructure requirements of the Disability Act. This means that there were no administrative mechanisms to compel engineers within their respective organizations to show compliance to the built-infrastructure requirements of Ghana Disability Act.

Twenty-three engineers (23) representing 85% noted that the organization they represent provided incentives for compliance to the built-infrastructure provisions of the Disability Act in Ghana but 4 engineers representing fifteen percent (15%) indicated that the organization they represent had no provisions in place to offer incentives for compliance to the Act. This means that engineers are highly motivated to comply with the built-infrastructure requirements of Ghana Disability Act.

The results further showed that 23 (85%) engineers noted that they had full knowledge of the Disability Act, 2006 whilst the remaining 4 constituting 15% said they had no knowledge of the Disability Act. This means that the engineers are abreast of national issues such as the introduction of the Ghana Disability Act. Thus, construction-related professionals with training and retraining from periodic seminars, lectures and workshops are more likely to show a high level of compliance to the built-infrastructure requirements of the Disability Act (Wilk, 2001).This is because most of the engineers have completed their tertiary education and are well-informed on issues.

The results, as indicated on Table 4.3, revealed that the engineers spent an average of 15 years in school with an average industry experience of 8 years. Confirming Salmen, (2001), findings that professionals with high level of formal education tend to upgrade and reinforce their skills and expertise to keep pace of the changing needs of societal circumstances .This implies that most of the engineers have received tertiary training and have enough experience. This is because training of engineers mostly takes place at the tertiary levels of education.

Table 4.3 Demographic variables of engineers

Variables	Frequency	Percentage	Mean
Sex			
Male	21	78	
Female	6	22	
Age			
18-24	4	15	
25-29	5	18	
30-39	7	26	
40-49	8	30	
50+	3	11	
Size of organization			
Large	14	52	
Small/medium	13	48	
Policy of compliance			
Yes	9	33	
No	18	67	
Incentive for compliance			
Yes	23	85	
No	4	15	
Knowledge of Disability Act			
Yes	23	85	
No	4	15	
Average years of formal education			15
Average years of industry experience			8

(Source: Field survey, 2018)

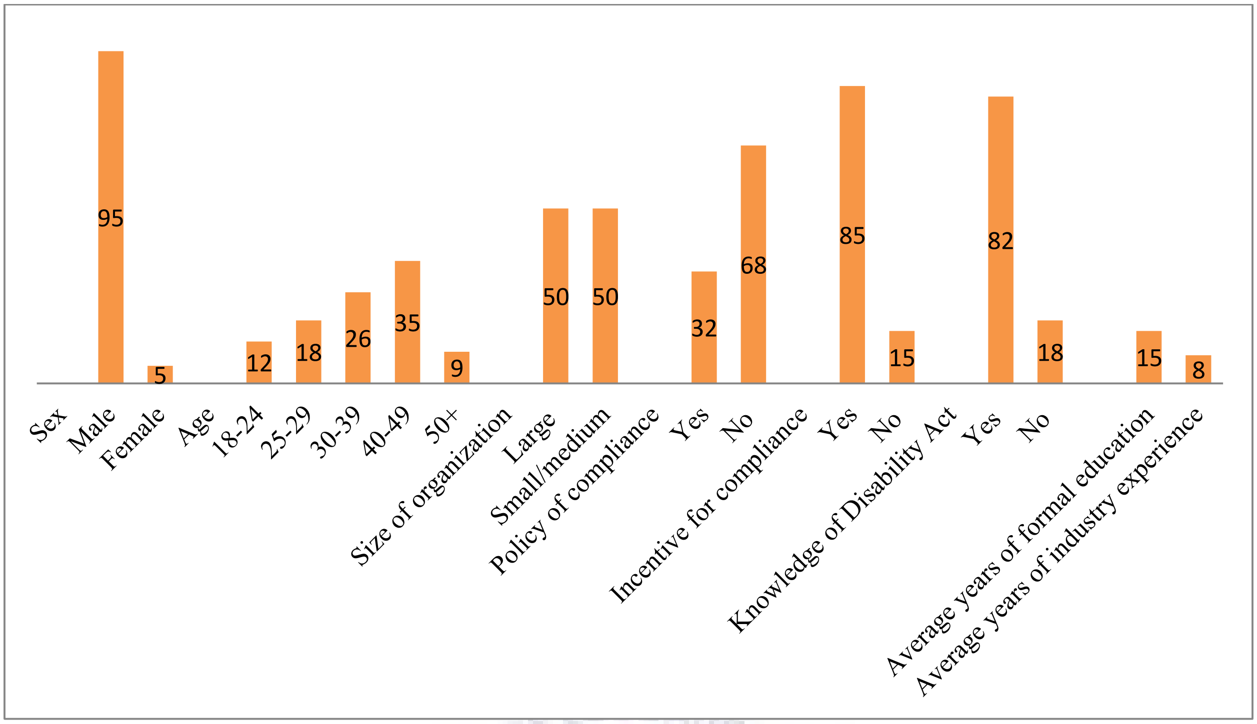

Fig 4.3 Demographic variables of engineers (Source: Field survey, 2018)

4.2.4 Level of compliance to the built-environment provisions of the Disability Act (715)

In order to measure the dependent variable, the respondents were made to rank the level of compliance on a four point Likert scale ranging from 1 (Very high) to 4 (very low). Results of the responses are presented in Table 4.4;

Table 4.4 Level of compliance to the built-environment provisions of the Disability Act

Level of compliance	**Frequency**	**Percentage**
Very high	11	10.6
High	17	16.3
Low	31	29.8
Very low	45	43.3
Total	**104**	**100.0**

(Source: Field survey, 2018)

As indicated above, majority of the respondents 45 (43.3%) responded that the level of compliance to the built-environment provisions of the Act was very low, followed by 31(29.8%) who indicated the level of compliance to be low. Moreover, whilst 17(16.3%) indicated the level of compliance to be high, only 11(10.6%) revealed that there is very high level of compliance to the built-environment provisions of the Act.

The level of compliance to the built-infrastructure requirements of the Disability Act was found to be very low in the Kumasi Metropolis. This may be the result of the unavailability of the national building standards and high budget allocation for the design and construction of barrier-free infrastructure especially in public buildings. This is consistent with the results of Danso *et al.,* (2011) who found that some selected monumental buildings in Accra presented infrastructural barrier to people with disability. The results of audit assessment Soyingbe and Adenuga (200) also confirmed that 275 public buildings in Nigeria lack a number of disability-friendly infrastructures.

Table 4.5 Model summary

No of obs.	Prob > F	R- Squared	Adj R- Squared
104	0.0013	0.6198	0.1487

(Source: field survey 2018)

The probability test ratio was found to be highly significant with a chi square value of 0.0013 whilst the R-squared of the model which is 0.6195.

4.2.6 Constraints to compliance with the built infrastructure requirements of the Disability Acts (2006) in Ghana

Table 4.5 presents analysis of constraints to compliance with the built infrastructure requirements of the Disability Acts (2006) in Ghana. The ranking ranged from one to four, with one being the most pressing constraint. One represented very high, two high, three low and four very low. The results revealed that high budget allocation was the highest constraint to compliance with the built infrastructure requirements of the Disability Acts (2006) in the study area. The second most significant constraint was the absence of national standards. The lack of stakeholder commitment was ranked third. The poor enforcement of the Disability Act then follows as the fourth-ranked constraint to compliance with the built infrastructure requirements of the Disability Acts (2006) in the study area. Whilst the fifth-ranked constraint was lack of accessibility audit, the least significant constraint was lack of appropriate technology.

High budget allocation was found to be the most pressing constraint to compliance with the built infrastructure requirements of the Disability Acts (2006) in the study area. Addi (2011) noted that government budget allocation to the various departments and agencies of the state is woefully inadequate. This is mostly the case as the government of the day is mostly faced with financial insufficiency relating to the needs of the various ministries, organs, departments and other dependents of government funds. This is compounded by the reality that, most of these governmental and non-governmental bodies do not have capacity to internally generate revenue to meet organizational goals.

The absence of national standards for the design and construction of built-infrastructure followed as the second most pressing constraint. This supports the results of Kportufe (2015). Due to the absence of the national standards, professionals and others who matter in the construction or built-environment industry lack a common national framework serving as a guideline on how they can comply with the design and construction of built-infrastructure especially in public buildings.

The coefficient of Kendall (***W***) indicates that about 70% of the respondents agree to the ranking of the constraints. This implies that majority of the built-environment professionals in the study area find the absence of national building standards and high budget allocation as the most serious constraints to compliance with built-infrastructure requirements of the Disability Act.

Table 4.6 constraints to the implementation of the built infrastructure requirements of the Disability Acts (2006)

Constraints	Mean score	Rank
High budget allocation	2.63	1
Absence of national standards	2.75	2
Lack of stakeholder commitment	3.78	3
Poor enforcement of the Disability Act	3.69	4
Lack of accessibility audit	3.89	5
Lack of appropriate technology	4.13	6

Test statistics

N = 104

Kendall's W = 0.738

Chi square = 71.855

Df = 4

Asymp. Sig = 0.000

(Source: field survey 2018)

4.3 Results of interview

4.3.1 Results of Interviews from institutional heads

The results of the interviews from ten (10) management personnel of public health care institutions, government department and agencies, and public tertiary institutions are presented below. The semi structured interviews yielded some interesting results. The interviews were tape–recorded, transcribed and analyzed under thematic areas. The notes taken at the interviews have been also analyzed as part of the interview evidence.

Interviewees agreed that generally there were many factors which served as constraints to the level of compliance to the built-infrastructure of the Disability Act, 2006. This is demonstrated in the following statement from one respondent:

"……..issues relating to the promotion of the fundamental human rights of disabled persons are on the heart of the management of this school, especially after the passage of Disability Act. Management has always considered renovating the existing facilities to make them accessible to disabled persons but we are confronted by a number of issues"

This supports Bayes and Franklin (1971), assertion which stressed that the growing efforts by various units of the society to profoundly understand the scope of disability was underpinned by the need to formulate policies in order to address the socio-economic challenges of people with disability.

Majority of the management members responded that building all-inclusive infrastructure or modifying current built-infrastructure requires a huge financial outlay. The public institutions are internally unable to raise enough revenue to support financial allocations from the government. According to them, this phenomenon has terribly affected their ability to show compliance to the built-infrastructure requirement of the Disability Act, 2006. This substantiated the results of the quantitative results which ranked high budget as the most pressing constraint to the level of compliance. On this issue, a board of director of a tertiary institution asserted that:

The school has been operating on a shoe-string budget. What bothers me most is that subventions from the national government are also inadequate and do not get to us on time largely because government wants the school to wean itself from dependence and become autonomous…..actually we need more financial support.

On the same budget of financial constraints, an administrator of a public health care institution posited:

"…….we do lack the capacity to mobilize funds within our internal spheres to embark upon some of these necessary infrastructures to aid the movements of the disabled in our hospital. It is so disheartening that sometimes they have to be carried by relatives or other people before they can move to some parts of the hospital to undergo treatment"

Similarly, Imrie and Hall (2011) noted that the provision of a fully accessible built-infrastructure requires a huge financial outlay.

Poor enforcement of the Ghana Disability Act, 2006 was also cited by the key management personnel as a major constraint to the level of compliance to the built-infrastructure requirements of the Ghana Disability Act, 2006. To one of the interviewees:

"We are not under no compulsion or circumstances to renovate our building infrastructure to suit the barrier-free designs as spelt out by the Act …we only consider them just as a mere advice"

This coincides with the result of a study by Ojok (2012) where lack of enforcement of the Disability Act was found to be one of the key implementation challenges in Uganda. It is conspicuous that there exist a number of implementation loopholes in the Ghana Disability Act, 2006. The Ghana Disability Act, 2006 therefore lacks a provision that may bind stakeholders in the built-environment industry to comply to the built-infrastructure requirements of the Act.

Moreover, there is also the absence of national building code as a frame work to guide built-environment professionals and various stakeholder groups within the built-environment industry. A chief Executive Officer (CEO) of a local government department espoused that:

"Most of the contractors who undertake our construction projects tell us they do not have any uniform design as to how they may put up say a ramp or sidewalk…….they say sometimes they have to rely on some designs from the internet which may necessarily not be suitable for our local conditions and circumstances"

Unlike United Kingdom, Australia, United States of America where there are national building code which clearly specifies the designs and standards of built-infrastructure, The existing Draft Ghana Building Code (1988) and the National Building Regulations (1996) are virtually out of date and have since not been revised to meet the barrier-free provisions of the built-infrastructure requirements of the Disability Act (715) of 2006 in Ghana. That is Ghana lacks such a national standard. The code serves as regulating mechanism on how the built environment should be designed to guarantee it's barrier-free to persons with disability. It only behooves on a few professionals to copy designs and guidelines that have been adopted by other advanced countries.

Another important constraint has to do with the population size of the disabled persons in the society vis-a-vis the cost involve in the establishment of an all-inclusive built-environment to facilitate the accessibility of a few disabled persons.

"Compare the number of disabled persons in this school to the number of the able-bodied; you will realize that they constitute just a fraction of the total student population. It therefore does not make economic sense to construct all-inclusive infrastructure which may benefit a tiny section of the school population"

One of the key arguments postulated by Imrie and Hall (2011) as challenges to efforts in overcoming architectural disability is the smaller size of the disabled users of a given facility. Practically, stakeholders find it financially imprudent to expend scarce resource in the construction of a design-for-all infrastructure which fulfills the accessibility needs of a few disabled persons.

4.3.2 Results of interviews from planners

Responds from the planners reflected that lack of accessibility audit before buildings are commissioned was among the many factors which served as constraints to the level of compliance to the built-infrastructure of the Disability Act, 2006. This is demonstrated in the following statement from one respondent:

"They always rush to commission new buildings….instead of them to take a critical step to audit the buildings to see if they are fitted with ramps, elevators and other disability-friendly installations, they just commission them without recourse to accessibility audit. It's nobody cares about the disabled…….and this is very worrying….hmm."

Another key factor of constraint as pointed out was the ineffectiveness of disability groups to compel government and other civil society groups to enforce compliance to the built-infrastructure requirements of the Act. One of the planners noted:

"*…….the Ghana Federation of Disability and other disability groups are just not up and doing…they have failed to promote the interest of their members. They are unable to put up a strong front to pile pressure on the government and managers of government departments and buildings to renovate the old buildings to incorporate disability-friendly designs"*

Ojok (2012) noted that the ineffectiveness/silence of disability communities is partly responsible for the suffering of PWDs in Uganda. He explained that, Disability groups are supposed to champion the cause of the disabled. They are responsible to advocate for passage and implementation of disability laws. Thus where this body is silent or ineffective the disabled suffer.

High cost of installing disability-friendly designs in buildings was also cited among factors that constrain compliance to the built-infrastructure requirements of the Ghana Disability Act. Imrie and Hall (2011) argued that designing fully accessible built environment is costly. The respondents seemed to agree with Imrie and Hall (2011). They unanimously agreed that designs which incorporate the needs of PWDs are comparatively complex and expensive. One of them explained

'' Take it for instance the situation where you have to provide ramps at building entrances together with steps. The construction of the ramp brings another cost. Moreover, spaces in washrooms should be wide enough to ensure that wheelchair users can use them. Fittings and

fixtures in buildings are specially designed to ensure that the disabled can use them. All these things add up to the cost of construction".

Thus, the fear of the increase cost of construction put some of the designers and clients off especially when there are few disabled people who will use the facility. One of the planners put it:

"It takes so much money to renovate old buildings and fit disability-friendly designs……sometimes owners of building think that the cost of putting up ramps, elevators can be used to build other buildings''

Planners also bemoan the absence of universal designs as a major constraint to the compliance to the built-infrastructure requirements of the Disability Act:

"The Ghana Disability Act is not specific on what designs and measurements should ramps, doorways etc. take…that's a big problem"

In some cities like London, Toronto, Brantford etc. there is a specially designed standard/code on accessibility of PWDs to the built environment. The codes provide guidelines on how the built environment should be design to make them barrier free. However, in this country there are no such standard.

However, in this country there are no such standard. The Disability Act does not have any design guidelines. Thus only few people who are abreast with foreign design standards are able to use them in their designs. The above report once again highlights another deficiency on the part of the country in our effect to ensure a barrier free all-inclusive built environment

4.4 Results of Observation

The environments and selected buildings of public health institutions, government departments and agencies and public tertiary institutions were observed to determine the level of compliance to the built-infrastructure requirements of the Ghana Disability Act, 2006. The standards as published by the Department of Economic and Social Affairs (SOLIDERE, 2004) were used as a guide in this study. The areas of observation covered horizontal and vertical circulation and access routes

4.4.1 Results of the researcher's observation at public health institutions within the Kumasi Metropolis

The researcher observed the access routes and vertical circulations of the Okomfo Anokye Teaching Hospital and Suntreso Government Hospital.

4.4.1.1Observation from Okomfo Anokye Teaching Hospital

From the observation, it was gathered that, to some extent, there was compliance to the built-infrastructure requirements of the Disability Act, 2006. For instance, some of the newly-constructed blocks like accident emergency center and the mother and baby unit incorporated disability friendly designs to the access route infrastructure, but most of them inadequately did not meet the standard requirements. The ramps only lead the routes to the first floor of the storey buildings, implying that access routes in the upper floors of the buildings were inaccessible to disabled users. It was common for the researcher to observe disabled users carried and helped by relatives before they could make up to the upper floors of the storey.

These observations are illustrated in the plates below

Fig 4.4 Access route at the Accident and Emergency Center of Okomfo Anokye Teaching Hospital, Kumasi is disability friendly (Source: field survey 2018)

Fig.4.5. The main entrance of the physiotherapy unit at Okomfo Anokye Hospital, Kumasi meets standard requirements prescribed by the disability Act (Source: field survey 2018)

Fig 4.6 Entrance and access routes of Mother and Baby unit constructed more recently is disability friendly (Source: field survey 2018)

Fig 4.7 These stairs are the access route to upper floors in the blocks A, B, C and D of the health facility are not accessible to the physically challenged (Source: field survey 2018)

Fig 4.8 Majority of the elevators in A, B, C and D blocks are nonfunctional. A source of worry for the physically challenged. (Source: field survey 2018)

Fig 4.9 The gradient for this ramp constructed recently ear nose and throat center of KATHT is too steeply (Source: field survey 2018)

Fig 4.10 The car park and linkages to buildings at accident and emergency center of the KATH are not accessible to the disable (Source: field survey 2018)

Fig 4.11 This building under construction at the KATH is without access route for the disabled (Source: field survey 2018)

4.4.1.2 Observation from Suntreso Government Hospital.

In the case of Suntreso Government Hospital, majority of the buildings are not storey as they were short buildings. Even though, there were ramps to the buildings most of the width measurements did not meet the required standards. The Suntreso Government hospital blocks are also mostly short ones. In the old buildings there were no ramps. However, their new buildings were fitted with ramps, thereby making them disability friendly**.** However the few storey buildings ramps at the entrances as well.

Fig 4.12: Entrance to consulting rooms in Suntreso hospital lack adequate ramp at the entrance. (Source: field survey 2018)

Fig4.13: The Male ward in Suntreso hospital has ramp along the steps and ramp housed in the stairwell up to the first floor. (Source: field survey 2018)

Fig 4.14: The materials center in the Suntreso hospital lacks ramp. (Source: field survey 2018)

The built infrastructure as Observe at Okomfo Anokye Hospital and Suntreso Hospital showed that although inadequate conscious effort is been taken to ensure that the access routes are disability friendly. About sixty percent (60%) of these buildings are below standards that meet barrier free environment. Even though majority of the buildings have been innovated to provide access routes for the disable, these additions do not meet international designed standards to make them barrier-free to disabled users due to lack of space and adequate fund.

4.4.2 Results of observation at government department and agencies within Kumasi Metropolis

Some buildings of public interest where government services are rendered to general public including the disable were observed to see whether they comply with the built-infrastructure requirements of the Disability Act, 2006. The findings are illustrated below.

4.4.2.1 Observation from Adum Post Office

A close observation of the Kumasi central post office revealed that the access route was not disability friendly. Ramps are totally absent whereas the only means of accessing the gigantic tall structures are stairs. This make it difficult and almost impossible for the physically challenged to easily have access to the services rendered there as illustrated in the plates below.

Fig4.15: The Adum Post Office, Kumasi lacks provision for the disable to easily access the mail box (Source: field survey 2018)

Fig 4.16: The ramp at Main entrance at the Electricity Company at Adum, Kumasi is too smooth and steep for the disable (Source: field survey 2018)

4.4.2.2 Observation from Adum government ministries

The ministries building at Adum in the Kumasi Metropolis is the place where offices of most government agencies and department are found. With service rendered there and the professional springing from different knowledgeable background, it would be easily assumed that the physically challenged would gain easy access to these places.

To the dismay of the researcher, this place is not only dilapidated but it poses danger to the disabled user. After struggling to forefront of the offices in these infrastructures, the physically challenged have to struggle to enter any of the offices at the ground level. The only means of accessing higher floors are stair. This does not comply with the built-infrastructure requirements of the Disability Act, 2006 as illustrated below:

Fig 4.17: Entrances to the buildings at the Kumasi ministries lacks provisions for per persons with disability (Source: field survey 2018)

Fig 4.18: These entrants at the Adum Ministries is dilapidated and dangerous to the users including the disabled persons (Source: field survey 2018)

4.4.2.3 Observation from Legal Aid Building

The legal aid building at Adum was constructed recently. Its primary function is to ensure that the fundamental human rights of all persons including the disable are met.

It was observed that a steeply ramp is provided along the steps at the main entrance with accompanying rails hand rails as illustrated in fig. 4.18a. The ramp also ends at the main corridor of the building. For any vertical movement, one has to use elevator which is mostly faulty or the stairs as illustrated in fig. 4.18b.

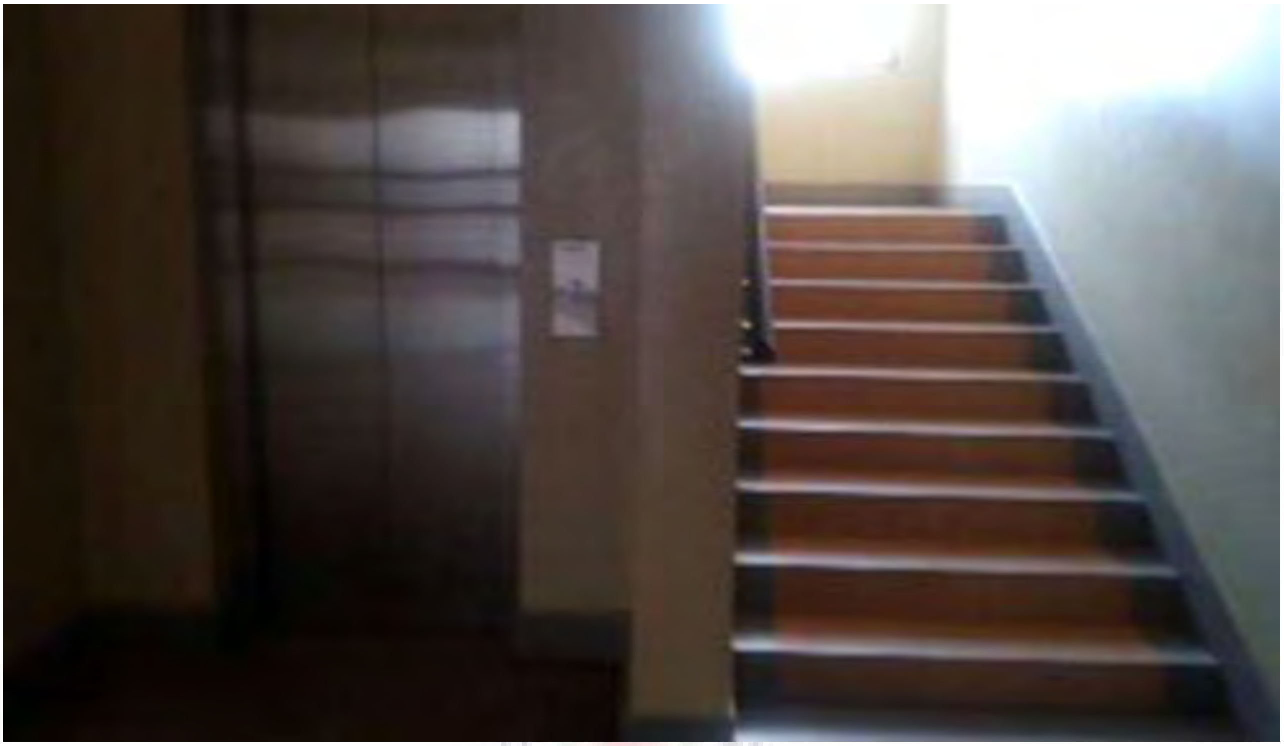

Fig 4.18a: The elevator at the legal aid building, Kumasi is faulty.

(Source: field survey 2018)

Fig 4.18b: This ramp at the entrance of the legal aid building, Kumasi is too narrow in width and steeply for comfortable of the disabled (Source: field survey 2018)

Observation at the building of Kumasi ministries and other departments and agencies showed that the access routes are not disability friendly. About ninety percent (90%) of these edifices are below standards that meet barrier free environment. Even though majority of the buildings are old, the access routes have not been redesigned to meet the international designed standards to make them barrier-free to disabled users.

4.4.3 Results of observation at the Public tertiary institutions within Kumasi Metropolis

The access routes of University of Education, Winneba - Kumasi campus of (UEW-K), Kwame Nkrumah University of Science and Technology (KNUST), and Kumasi Technical University (KsTU) were also observed in order to find out if they comply with the built-infrastructure requirements of the Disability Act, 2006.

4.4.3.1 Observation from University of Education, Winneba - Kumasi campus

A close observation of the accessed facilities of the University of Education, Winneba - Kumasi campus revealed that the level of compliance was very low. Even the access routes of both old and new building did not fully comply with the standard requirements. It was also observed that in all of the residential halls, disabled students are accommodated on the ground floors due to lack of access to the upper floors for disables. This promotes discrimination against the disabled.

Administration blocks, lecture halls and libraries are not readily accessible to the disabled persons. The main library and computer lab in the institution are found on the first and second floors which can only be accessed through stair. To make use of these facilities, the disabled has to rely on their colleagues to get there. The only high rise structure with elevator is the faculty's block but the elevator has never functioned since its installation. There is Washroom designed to meet the needs of the physically challenged.

Buildings under construction are also not user friendly to the physically challenged. For instance, the multipurpose auditorium, an ongoing project is not friendly right from the entrance to the inner part of the facility.

The findings from these observations are illustrated in the figures below:

Fig 4.19: The Library, Computer lab and lecture block of the EUW, Kumasi lacks provisions for vertical and are only accessible through stair. (Source: field survey 2018)

Fig 4.20: This temporal placed at the access route to the new auditorium to make accessible to the disable is inadequate. (Source: field survey 2018)

Fig 4.21: These walkways at institutions UEW- Kumasi are not friendly to the disable. (Source: field survey 2018)

Fig 4.22: There is no provision for Persons with disability to Access the entrance at the Opoku Ware Hall at the UEW- Kumasi (Source: field survey 2018)

Fig 4.23: Corridors to the Opoku Ware Hall lacks provision to the disabled.

(Source: field survey 2018)

Fig 4.24: Washrooms at the UEW-Kumasi lacks provisions for the physically challenged (Source: field survey 2018)

Fig 4.25: The main entrance and interior of the auditorium building under construction at UEW-Kumasi lack provision for the disabled (Source: field survey 2017)

4.4.3.2 Observation from Kwame Nkrumah University for Science and Technology (KNUST)

As a university of such high standard in the Metropolis, KNUST has the reputation of training more professionals in the built environment across the length and breadth of the country. It also runs more programs aimed at training professionals for the built environment.

The researcher therefore considered it prudent to observe the built infrastructure of the KNUST. Like its sister tertiary institutions, the observation revealed that majority of the buildings are not user friendly to the disabled.

The environments and selected buildings were studied to determine the extent of accessibility provided to the physically challenged. The accessibility standard published by the Department of Economic and Social Affairs (SOLIDERE, 2004) was used as a guide in the studies.

The selected area was the buildings at the faculty. The observation was conducted to establish the extent to which buildings are accessible to the physically challenged. Indications were that none of the buildings had ramps to aid access between floors whiles only the petroleum building had lift installed in it. The institute for distance learning block also had ramps at the entrance to ground floor as well as in front each door. However, the building had no ramps to aid access between floors. Although there is shaft provided, the lift is yet to be installed to aid movement between floors to enable easy movement from floor to floor by the disabled.

Results from the observation are presented in the figures below:

Fig 4.26: Faculty of Social Sciences building at KNUST, Kumasi. Lacks provisions for both horizontal and vertical movement for the disabled (Source: field survey 2018)


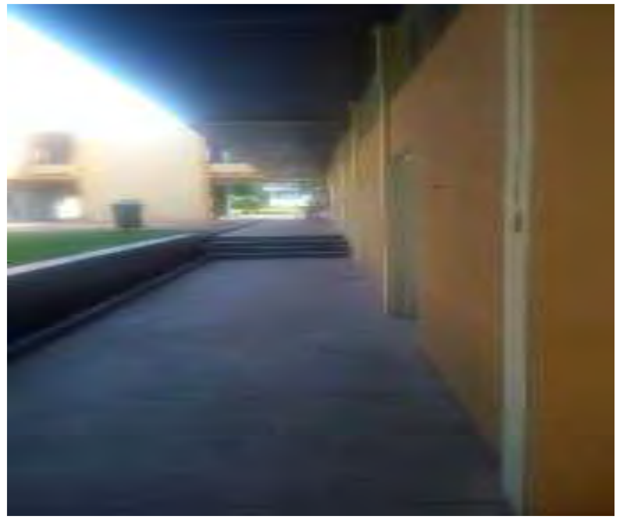

Fig 4.27: The faculty of Architecture building at KNUST, Kumasi lacks provision for the disable at both entrance and corridors (Source: field survey 2018)

Fig 4.28: College of Engineering building at KNUST, Kumasi Lacks provisions for both horizontal and vertical movement for the disabled . (Source: field survey 2018)

Fig 4.29: Faculty of Pharmacy and Pharmaceuticals Sciences at KNUST, Kumasi Lacks provisions for both horizontal and vertical movement for the disabled. (Source: field survey 2018)

Fig 4.30 Institute of Distance Learning (IDL) building Lacks provisions for both horizontal and vertical movement for the disabled KNUST, Kumasi. (Source: field survey 2018)

Fig 4.31: Center for drug analysis quality control Kumasi lacks provisions for the disabled at the main entrance. (Source: field survey 2018)

4.4.3.3 Observation from Kumasi Technical University (KsTU)

The Kumasi Technical University (KsTU) was also observe to ascertain the level of compliance to accessibility requirements of the Disability Act as far as the built is concern

From the observations, the standards of the buildings are far below expectation taking into cognizance access to build-infrastructure requirements of the Disability Act. For instance, the only ramp found on the administration block which leads to the elevator is poorly constructed. There is no ramp or hand rail leading to the main auditorium and the daze. There is no other means for the disabled to reach the library and administrative office in the building in case the elevator develops a fault.

It was also observed there is no sign of effort to improve the existing buildings like lecture halls and halls of residence to make it easily accessible to the physically challenged.

However, Some efforts have been put in place to ensure the newer buildings meet disability friendly standards like the MP building installed in the administration blocks which serve as a means for the disabled to access services at the upper floors of those buildings.

Access routes to car parks, walk lane and other common places are woefully inadequate and discriminatory to the physically challenged, as they have been obstacles to their movements.

The findings from these observations are illustrated in the figures below:

Fig 4.32: The main administration block At KsTU, Kumasi has elevator but lacks provisions for the disable at the entrance and inside the auditorium.

(Source: field survey 2018)

Fig 4.33: The B-tech Block at KsTU, Kumasi lacks provisions for both horizontal and vertical movement for the disabled (Source: field survey 2018)

Fig 4.34: lecture blocks A, B and C at KsTU, Kumasi lacks provisions for both horizontal and vertical movement for the physically challenged.

(Source: field survey 2018)

Fig 4.35: The newly constructed MP Block at KsTU, Kumasi has guarded ramp at the entrance but lack those provisions at other parts of the building. (Source: field survey 2018)

Fig 4.36: This is a newly constructed for Dispensary Technology department At KsTU, Kumasi is disability friendly. (Source: field survey 2018)

From the observations in the above mentioned institutions, it appears that many areas around the selected public buildings in the Ashanti Region such as floors/staircase, toilet and urinal facility, lecture hall, furniture's, students affiliated halls, administrative offices as well as playgrounds were accessible with difficulties for the physically disabled persons. This indicates that regardless of their right to get to these public facilities, the physically disabled persons have not been considered by public institutions whereby many infrastructural systems have got barriers such as stairs, narrow paths, higher tables in laboratories and classrooms, non supportive toilets and bathrooms that are not friendly. Physically disabled persons who were using wheel chairs and clutches encountered difficult to reach some places due to the nature of infrastructure which were unfriendly

Rimmer et al (2005) argued that, those physically disabled persons/students who do start school, colleges and universities in those environments are at increased risk of dropping out.

An observation at the various selected public buildings in the Ashanti Region of Ghana was not convincing, as many buildings were not accessible easily to persons with physical disabilities. Disability access is becoming very critical requirement. Most of the disability organization and NGOs fight to acquire their social needs, but most public buildings are not accessible and barrier free environment to people with disability when designing building (Keerthirathna, Karunasena, & Rodrigo, 2018). Keerthirathna, et al. (2018) emphasized that people neglect the disability access when planning and designing.

Additionally, the findings again aligns with the study by Agarwal and Chakravarti (2014), that most public buildings design does not improve access to infrastructure and creates an enabling environment which benefits all, including people with reduced mobility; people with temporary and permanent mobility impairments due to age, medical conditions, and latent diseases; families with young children; non escorted children; persons with temporary ailments such as fractures; pregnant women; persons carrying heavy luggage; people with communication problems, such as different linguistic and ethnic groups like migrants and tourists. The results also agree with the study conducted by Kabuta (2014) on the problems facing students with physical disabilities in higher learning institutions in Tanzania.

The overall results show that the management of the selected public institutions in the Ashanti Region virtually do not involve people with disability (PWDs) in building and infrastructural development in public institutions. However, the study indicated that, some managements of public institutions sometimes take into consideration the advice of PWDs in any infrastructural development and thus involve PWDs for design and construction supervision and involve PWDs in the archive for drawings and other construction project documents.

Rimmer et al (2005) indicated that difficulties in using and accessing the higher education institutions buildings and other infrastructure are that, the views of PWDs are not included in the designing stage. A study by Rimmer et al (2005) showed that more there are more than sixty percent (60%) of students with physical disabilities studying under non conducive learning environment. Christensen, Blair and Holt (2007) continue to argue that architects and construction engineers fail to liaise with PWDs during construction of public buildings. This could be a reason why PWDs, in particular the wheelchair users, are not encouraged to be educated because of the obstacles they face in accessing buildings in the educational sector (Christensen, Blair & Holt 2007). Christensen et al. (2007), further reported that two out of four (50%) school libraries measured in educational buildings were inaccessible due to the factor the PWDs were not involved in the designing stage of the building. This implies that wheelchair-mobile students would not have a 50% access chance to the libraries in the educational sector. This study agrees with similar report by Hamzat and Dada (2005) that contractors to the less extent involve PWDs in public building and infrastructural development which leads low level of accessibility of buildings used for educational purposes.

Moreover the infrastructures and settings in educational institutions were not friendly to students with physical disabilities because of the fact that the stakeholders fails to take into consideration the advice of PWDs in any infrastructural development, involve PWDs for design and construction supervision and involve PWDs in the archive for drawings and other construction project document (Simpson, 2002). Simpson, further revealed that most of the physical disabled students experienced barriers to accessing their education due to the physical environment or teaching and learning facilities and ICT facilities are among the most limited.

The finding contradicts with the study by Rimmer et al. (2005) that architects and construction engineers in USA took into account the needs of patients visiting the hospitals that have mobility challenges and thus use wheelchairs for ambulation and need accessible ramps and facilities to easily maneuver their way inside the buildings. It could also be attributed to the fact of awareness creation since the passage of the Disability Law on the special needs of PWD in Ghana.

The result shows that the lack of enabling policies and frameworks for the implementation of Disability Act in public institutions, few number of disabled persons enrolled or can access public buildings such as universities, hospitals, Malls etc, lack of strong institutional structure for the enforcement of the Disability Act to compel designers to comply, lack of consultation and involvement of PWDs in decision making, and inadequate budget allocation for the implementation disability friendly infrastructure are the key constraints to disability-friendly design of buildings and related infrastructure in public places. Imrie (2002), explained the national and legal provisions regulating the construction of barrier-free structures are weak or non-existent in many countries. Imrie (2002) indicated that there are many constraints to disability-friendly design of buildings and infrastructure.

The finding agrees with the results of Ojok (2012) that lack of enabling policies and frameworks for the implementation of Disability Act, lack of a strong institutional structure for the enforcement of the Disability Act, and inadequate budget allocation for the implementation disability friendly infrastructure are challenges impeding the disability-friendly design of buildings and infrastructure. Ojok (2012), noted that, the ineffectiveness/silence of disability communities is partly responsible for the suffering of PWDs in Uganda. He explained that, Disability groups are supposed to champion the cause of the disabled. They are responsible to advocate for passage and implementation of disability laws. Thus, where this body is silent or ineffective the disabled suffer.

The agreement of the respondents on lack of consultation and involvement of PWDs in decision making, and inadequate budget allocation for the implementation disability friendly infrastructure as a constraints to disability-friendly design of buildings and related infrastructure in public places concurs with Ojok (2012) who found that difficulty in the coordination of the roles of other ministries, lower government structures and private entities responsible for the implementation of the Act is one of the major challenges associated with the implementation of the Disability Act in Uganda by design buildings and related infrastructure that are accessible to PWDs. Hassen (2012) also noted as being one of the challenges in the designing friendly buildings and related infrastructure. However, monies reserved for the construction of infrastructures are often found to be insufficient in terms of its ability to finance the project given that all the requirements for PWDs access are fully incorporated (Ojok, 2012). It is noted that the lack of effective financing is a major impediment to the implementation of the Disability Act.

(Ojok, 2012). For instance, in advanced countries, it is estimated that between 20% to 40% of the disabled to not have their needs interim of assistance devices been met. Moreover, in most developing economies the governments cannot provide satisfactory services for the disabled.

The view of the respondent aligns with the findings of Imrie and Hall (2011) that the design of the built environment cannot be completely all inclusive due to the following reasons:

i. Low demand from the disabled to necessitate the provision of an accessible built-environment for them. In other words, the percentage of the disabled who will be using a given facility compared to the able bodied persons are sometimes some insignificant that, it become a thing of no necessity to incorporate their needs in the design of those facilities.

ii. It is highly expensive to provide an environment that is fully accessible. In explaining this, Imrie and Hall (2011) argue that, the extra space, additional fixtures and devices add up to the complexity of projects which fully considers the needs of the disabled. Moreover, the more complex the design, the more expensive it becomes.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary of findings, conclusions and recommendations of the study.

5.2 Summary of the findings

The following are the summary of findings:

- The Ghana Disability Law does not have any provision and clause which enforces strict compliance to its built-infrastructure requirements.
- Built-environment professionals and stakeholders do not have internal policy which enforces compliance to its built-infrastructure requirements of the Ghana Disability Law.
- There is inadequate financial support to the built-environment organizations within the public sector whilst those in the private sector lack the capacity to generate enough funds internally.
- The existing building code is much older whereas there is absence of national building standards to serve as a framework to guide professionals and all who matter in the construction industry.
- A number of the built-environment professionals within the study did not have sufficient knowledge of the built-infrastructure requirements of the Ghana Disability Law.

5.3 Conclusions

The study has confirmed that:

The level of compliance to the built-infrastructure requirements of the Act by built-environment professionals in the study area is very low. This is underpinned by the results of the Likert Scale, response from interviewees, the researcher's observation of the phenomenon and response to questionnaires within the study area.

Majority of the built-environment professionals in the study area revealed that there was no policy of compliance within their organization. This implies that most of the built-environment organization did not have any internal policy which defined their intentions of compliance to the built-infrastructure requirements of the Disability Act

The level of compliance to the built-infrastructure requirements of the Disability Act in the study area is significantly influenced by such variables as industry experience, years of formal education, policy of compliance and knowledge of the Disability Act.

Lack of adequate budget allocation and the absence of national building design standards are the most pressing constraints to compliance with the built-infrastructure requirements of the Disability Act (2006) in the study area. These rankings were supported by the results from the interviews of the management heads and the planners.

5.4. Recommendations of the Study

The following recommendations are made to address the findings;

- In order to compel the built-environment professionals in the study area to adequately comply with the built-infrastructure requirements of the Disability Act, enforcement provisions should be included to the Ghana Disability Law.

Better still, government can by law set up enforcement agencies charged with the responsibility of monitoring the compliance of built-environment stakeholders and construction professionals.

- The built-environment organizations within the study area should have a policy of compliance as an integral part of their mode of operation. This will ensure that most built-infrastructure of the public buildings they collectively establish will meet the barrier-free needs of people with disability.
- Since knowledge of the Disability Act was found to have a significant positive association with compliance to the built-infrastructure requirements of the Disability Act, stakeholders in the industry should regularly organize conferences, seminars and workshops in order to educate and upgrade the knowledge base of the professionals and all those who matter in the construction field.
- There should be adequate financial support allotted to the various public stakeholder organizations responsible for the design and construction of public buildings.
- Existing building code should be revised and better still provide a national building standards to serve as a framework to guide professionals and all who matter in the construction industry.
- Formal training institutions such as universities and technical universities should mount courses that will introduce topics under compliance to the built-infrastructure requirements of the Disability Act in Ghana

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APPENDIX I

This questionnaire seeks to collect data in order to study the compliance of construction professionals within the Kumasi metropolis to the built-environment provisional requirements of the Disability Act of Ghana. Kindly select the right response from among alternative answers for each question by ticking the appropriate box. Where alternative answers are not provided, fill in the gaps provided. You are assured of the confidentiality of this exercise because it will be solely used for academic purpose. Thank you for your contribution.

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SECTION A – BACKGROUND OF RESPONDENT

Please provide the following personal date

1. Gender
    a. Male
    b. Female

2. Age
   a. 18-24
   b. 25-29
   c. 30-39
   d. 40-49
   e. 50 and above
3. Level of education (yrs. spent in school)

   ………………

4. Job Designation
   a. Project manager
   b. Architecture
   c. Quantity surveyor
   d. Engineers
   e. Others
5. Industry experience (no. of yrs.)

   ………………..

6. Size of the organization
   a. Small/Medium
   b. Large
7. Existence of policy on compliance with Disability Act
   a. Yes
   b. No

SECTION B: Level of compliance with built-environment requirements of Disability Act

Rank the following statements as applied to your organization, using the scale 1 = very high, 2 = high, 3 = neutral, 4 = low, 5 = very low

8. Level of compliance with the Disability Act (use numerals)…………………………….

Using a 3 Point Scale; 1= does not exist; 2 = under construction; 3 = have completed,

Please select an option by ticking (√) the right column box

Items	**Does not exist**	**Still not completed**	**Have completed**
Doorways: Make sure doorways are at least 32 inches wide in order to allow wheelchairs to pass and check to see that doors open easily.			
Ramps: Provide ramps that cut into curbs and steps			
Stairways: Install ramps and elevators where possible.			
Flooring: Install smooth floor instead of plush for wheelchair mobility.			
Parking: Provide a drop-off zone in front of the entrance and designate "handicapped parking only" spaces close to every entrance.			
Counters: Have your reception desk low enough for a person in a wheelchair.			
Safety: Provide flashing fire alarms in addition to sounding			

alarms.			
Seating: Make sure that there are at least 1m between tables for wheelchair accessibility.			
Doorways: Make sure that the doorways are least 800mm wide.			
Stalls: Provide five feet in a circular space and three feet in a T-shaped space for proper wheelchair movement.			
Grab bars: Provide grab bars on both sides of the stall.			
Paths: Provide smooth paths for wheelchairs and, as a special service, staff to assist members in wheelchairs.			

SECTION D: Constraints to the implementation of the Disability Act Provisions

Please select an option by ticking (√) the right column box, using a Likert Scale 1-5 where 1=Strongly Agree; 2= Agree; 3=Neutral; 4=Disagree; 5= Strongly Disagree,

Item	**1**	**2**	**3**	**4**	**5**
Absence of national accessibility standards					
Poor enforcement of disability laws					
High budget allocation					
Lack of appropriate technology					

APPENDIX II

This interview is part of a study for an MPHIL in Construction Technology at University of Education, Winneba – Kumasi Campus (UEW-K). The objective of the research is to assess the level of compliance of built-infrastructure requirements of the Ghana Disability Law. This is mainly for academic purpose. I would be grateful if you could spare a few of your time in answering the questions before you. All information provided will be kept confidential.

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Interview Guide

Please provide your demographic information

1. Gender ………………………………………………………………..

2. Age ………………………………………………………………………..

3. Position ………………………………………………………………

4. Qualification …………………………………………………………

5. How long have you worked with this Institution…………………….

Kindly answer the questions below.

10. Are you aware of the built-infrastructure requirements of the Ghana Disability Law?

11. Are you able to comply with the built-infrastructure requirements of the Ghana Disability Law?

12. Are you motivated in any form to show compliance?

13. Do you factor the issues of compliance into the management decision-making?

14. What will encourage you to show compliance to the built-infrastructure requirements of the Ghana Disability Law?

15. What factors constrain you from showing compliance?

Thank you for your time