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FINAL PROJECT/ IMPLEMENTING UNIVERSAL DESIGN IN IRELAND

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BSC IN CONSTRUCTION MANAGEMENT

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UNIVERSAL DESIGN – A BROAD-SPECTRUM SOLUTION THAT PRODUCES BUILDINGS, PRODUCTS AND ENVIRONMENTS THAT ARE USABLE AND EFFECTIVE FOR EVERYONE, NOT JUST PEOPLE WITH DISABILITIES

ABSTRACT

Universal design is aimed at providing comfortable working and living conditions for all people to enhance development and support all people to achieve their goals regardless of their limitations. Ireland has been on the fore front amending the part M building regulations so as to ensure that all people are in a position to access buildings, surrounding environment and the services offered in these building. Different organizations have voiced their concerns through written documents with the aim of fighting for the social inclusion and participation of all citizens in national development regardless of their limitations. This is a person's impairment that does not disable them but living in environmental conditions that do not meet their needs and limits them from exploiting their full potential.

This thesis includes research on the different impairments that different people have and how they can be accommodated in society through putting up buildings that do not discriminate them from accessing and using its facilities. The facilities included in the research are WC facilities, entrance doors, exit routes during emergencies as well as the lifts and staircases. This report concentrates on the importance of involving designers in the decision making process as important stakeholders in ensuring accessibility of buildings. Conclusions have been made from past researches and recommendations given.

DECLARATION

I hereby declare that the work described in this dissertation is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree at this or any other university.

Student Name

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TABLE OF CONTENTS

	ABSTRACT	I
	DECLARATION	II
	ACKNOWLEDGEMENTS	III
	TABLE OF CONTENTS	IV
	ABBREVIATIONS	V
	TABLE OF TABLES	VI
	TABLE OF FIGURES	VII
1.0	INTRODUCTION	1
1.1	AIMS AND OBJECTIVES	2
1.2	SCOPE	2
1.3	JUSTIFICATION OF RESEARCH	3
2.0	LITERATURE REVIEW	4
2.1	LIMITATIONS OF THE RESEARCH	11
3.0	RESEARCH METHODOLOGY	12
3.1	RESEARCH DESIGN	12
3.2	SAMPLING	12
3.4	DESCRIPTION OF POPULATION	13
3.4	QUESTIONNAIRE/SURVEY	13
3.4.1	SAMPLE STRUCTURE	13
3.4.2	DISTRIBUTION OF THE QUESTIONNAIRE	14
3.5	CASE STUDY	15
3.6	QUESTIONNAIRE/SURVEY ANALYSIS	19
3.6.1	METHOD OF ANALYSIS	19
3.6.2	QUESTION SELECTION	19
3.6.3	ANALYSIS OF RESULTS	19
3.6.4	ANALYSIS OF RESULTS CONCLUSION	30
4.0	FINDINGS	31
4.1	TYPES OF DISABILITIES	31
4.1.1	MOBILITY	31
4.1.2	HEARING	32
4.1.3	VISION	32
4.1.4	BREATHING	33
4.1.5	GRIP	33
4.1.6	HEIGHT	34
4.2	PART M	34
4.2.1	ACCESS AND USE: M1	36
4.2.2	SANITARY CONVENIENCES: M2	36
4.2.3	SPECTATOR AUDIENCES FACILITIES: M3	36
4.2.4	DEFINITION: M4	36
4.2.5	APPLICATION OF PART M: M5	37
4.3	UNIVERSAL DESIGN	38
4.4	EVACUATION DURING EMERGENCY	42
4.5	COST	44
4.6	SPACE	45
4.7	ENSURING IMPLEMENTATION	46
4.8	PARKING	46
4.8.1	THE NEW AMENDMENTS	46
5.0	CONCLUSION	48
5.1	RECOMMENDATIONS	49
6.0	REFERENCES/BIBLIOGRAPHY APPENDICES'	

ABBREVIATIONS

BCA	=	Building Control Act
CEUD	=	Centre of Excellence in Universal Design
EU	=	European Union
ICT	=	Information Communication Technology
IWA	=	Irish Wheelchair Association
NDA	=	National Disability Authority
SCS	=	Society of Chartered Surveyors
TGD	=	Technical Guidance Documents
UN	=	United Nations
WC	=	Water Closet

TABLE OF TABLES

TABLE 1.0	TABLE SHOWING GENDER OF THE SAMPLE SIZE OF PROFESSIONALS WHO COMPLETED THE SURVEY ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 14
TABLE 2.0	TABLE SHOWING GENDER OF THE SAMPLE SIZE OF PROFESSIONALS WHO COMPLETED THE SURVEY ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 20
TABLE 3.0	TABLE SHOWING AREAS OF THE DESIGN PROFESSIONALS WHO COMPLETED THE SURVEY ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 21
TABLE 4.0	TABLE SHOWING AWARENESS DESIGN PROFESSIONALS WHO COMPLETED THE SURVEY OF PART M OF THE IRISH BUILDING REGULATIONS OF THE ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 22
TABLE 5.0	TABLE SHOWING IF OTHER REFERENCES ARE USED BY DESIGN PROFESSIONALS WHO COMPLETED THE SURVEY OF THE ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 23
TABLE 6.0	TABLE SHOWING IF DESIGN PROFESSIONALS' OPINION ON REQUIREMENTS MET FOR MAJORITY OF PEOPLE WITH DISABILITIES, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 24
TABLE 7.0	TABLE SHOWING IF DESIGN PROFESSIONALS' OPINION ON WHICH IMPAIRMENTS OF PEOPLE WITH DISABILITIES MET, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 25
TABLE 8.0	TABLE SHOWING IF ACCESSIBILITY FORM PART OF THEIR PROJECT BRIEF OF DESIGN PROFESSIONALS, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 26
TABLE 9.0	TABLE SHOWING OPINIONS OF DESIGN PROFESSIONALS ON PROBLEMS WITH REGARD TO ACCESSIBILITY, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 27
TABLE 10.0	TABLE SHOWING DESIGN PROFESSIONALS ON HOW OFTEN ACCESSIBILITY IS RAISED DURING PRE PLANNING MEETINGS WITH THE LOCAL AUTHORITY, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 28
TABLE 11.0	TABLE SHOWING DESIGN PROFESSIONALS OPINION ON TGD PART M BEING ENFORCED BY THE LOCAL AUTHORITY, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 29

TABLE OF FIGURES

FIG. 1.0	SHOWING: 'TEAM A' WALKING ABBEY STREET WITH GENNY ALONG THE LUAS LINE.	PAGE 16
FIG. 2.0	SHOWING: OBSTACLES ENCOUNTERED ALONG ROUTE.	PAGE 16
FIG. 3.0	SHOWING: TEAM A: LEARNING TO WALK WITH A BLIND CANE	PAGE 17
FIG. 4.0	SHOWING: 'TEAM A' COMING UP WITH THE IDEA THROUGH THE NIGHT.	PAGE 17
FIG. 5.0	SHOWING: 'TEAM A' COMING UP WITH THE IDEA THROUGH THE NIGHT.	PAGE 17
FIG. 6.0	SHOWING: 'TEAM A' PUTTING TOGETHER THE PRESENTATION.	PAGE 18
FIG. 7.0	SHOWING: 'TEAM A' PUTTING TOGETHER THE PRESENTATION.	PAGE 18
FIG. 8.0	SHOWING TEAM A: WINNERS OF THE UNIVERSAL DESIGN CHALLENGE PEOPLES CHOICE AWARD 5TH NOV. 2009.	PAGE 18
FIG. 9.0	GRAPH SHOWING GENDER OF THE SAMPLE SIZE OF PROFESSIONALS WHO COMPLETED THE SURVEY ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 20
FIG.10.0	GRAPH SHOWING AREAS OF THE DESIGN PROFESSIONALS WHO COMPLETED THE SURVEY ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 21
FIG.11.0	SHOWING AWARENESS OF DESIGN PROFESSIONALS WHO COMPLETED THE SURVEY OF PART M OF THE IRISH BUILDING REGULATIONS OF THE ON 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 22
FIG.12.0	SHOWING IF OTHER REFERENCES ARE USED BY DESIGN PROFESSIONALS WHO COMPLETED THE SURVEY OF THE ON PROFESSIONAL 'DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 23
FIG.13.0	SHOWING IF DESIGN PROFESSIONALS' OPINION ON REQUIREMENTS MET FOR MAJORITY OF PEOPLE WITH DISABILITIES, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 24
FIG.14.0	SHOWING IF DESIGN PROFESSIONALS' OPINION ON WHICH IMPAIRMENTS OF PEOPLE WITH DISABILITIES MET, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 25
FIG.15.0	SHOWING IF ACCESSIBILITY FORM PART OF THEIR PROJECT BRIEF OF DESIGN PROFESSIONALS, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 26
FIG.16.0	SHOWING OPINIONS OF DESIGN PROFESSIONALS ON PROBLEMS WITH REGARD TO ACCESSIBILITY, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 27
FIG.17.0	SHOWING DESIGN PROFESSIONALS ON HOW OFTEN ACCESSIBILITY IS RAISED DURING PRE PLANNING MEETINGS WITH THE LOCAL AUTHORITY, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 28
FIG.18.0	TABLE SHOWING OPINIONS OF DESIGN PROFESSIONALS TGD PART M BEING ENFORCED BY LOCAL AUTHORITIES, SURVEY; 'PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN'	PAGE 29
FIG.19.0	A REFUGEE LOCATION AS SHOWN: IRISH WHEELCHAIR ASSOCIATION, MAY 2009, BEST PRACTICE ACCESS GUIDELINES, DESIGNING ACCESSIBLE ENVIRONMENTS.	PAGE 43
FIG.20.0	SPACE REQUIREMENTS AS SHOWN: IRISH WHEELCHAIR ASSOCIATION, MAY 2009, BEST PRACTICE ACCESS GUIDELINES, DESIGNING ACCESSIBLE ENVIRONMENTS.	PAGE 45
FIG.21.0	SPACE REQUIREMENTS AS SHOWN: IRISH WHEELCHAIR ASSOCIATION, MAY 2009, BEST PRACTICE ACCESS GUIDELINES, DESIGNING ACCESSIBLE ENVIRONMENTS.	PAGE 45
FIG.22.0	PARKING REQUIREMENTS AS SHOWN: IRISH WHEELCHAIR ASSOCIATION, MAY 2009, BEST PRACTICE ACCESS GUIDELINES, DESIGNING ACCESSIBLE ENVIRONMENTS.	Page 47
FIG.23.0	PARKING REQUIREMENTS AS SHOWN: IRISH WHEELCHAIR ASSOCIATION, MAY 2009, BEST PRACTICE ACCESS GUIDELINES, DESIGNING ACCESSIBLE ENVIRONMENTS.	Page 47

1.0 INTRODUCTION

This thesis intended to explore the new amended Building Regulations part M 2009. From research carried out, Ireland has set itself targets of upgrading buildings to be accessible to everyone and also to be compliant with European Design. Part M of the Building regulations had to be updated in order for buildings to be accessible to everyone e.g. visually impaired, hearing impaired, pregnant women, the elderly, children and wheelchair access (Irish Wheelchair Association 2009).

This thesis focuses on part M of the Building Regulations and the Designer. However this dissertation is not only for designers but for construction managers to implement these designs at construction stage of a development. It is also for those who want to know more about the new Part M Regulations and how it affects the design process. This may range from the ordinary interested person to all those involved in the construction sector, including architects, engineers, planners, lawyers and builders.

Since the proposed amendment of Part M of the current Building Regulations was published, it has gained a lot of attention throughout the construction sector. This is due to the fact that amending any law in Ireland is an important issue and everyone must be aware of what the new changes will imply. The new Part M Building regulations will transform the way we construct buildings in Ireland. All new buildings will have to achieve Universal Design and also current buildings will have to be upgraded.

Universal Design has now been incorporated into the new regulations Part M and is considered a good way of meeting European standards in design. However, like any new changes, there is uncertainty and lack of confidence in the implementation of these standards into design. Along with this, there is also a major issue of cost. Even after grants, upgrading existing buildings are still costing an overwhelming amount of money. For the many that are involved in the construction sector, this is considered a major setback.

1.1 AIMS AND OBJECTIVES

The aim of the thesis was to;

- Help designers understand the new Building Regulations Part M
- Improve Designers' knowledge of the new policies of Universal Design
- Show how Universal Design can improve the built environment for everyone
- Show the importance of managing and implementing Universal Design in Ireland's Construction process
- To explore the cost of these changes.

The main objectives of the study were:

- To establish what the new Building Regulations 2009 Part M entail
- Determining the costs of implementing these regulations on New Build Developments in Ireland.

1.2 SCOPE

This thesis examined the specific amendments to Part M of the Building Regulations 2009. The main scope of the analysis relates to universal design in new build developments in Ireland. It examines both the technicalities and the design work needed in order to achieve a designer's view. Universal design is for everyone and its purpose is not to segregate people with disabilities. After all every one gets older and less mobile, this results in access to buildings becoming more difficult.

This thesis includes those with an impairment in their hearing capacity, sight, height and mobility including the deaf and the blind. It does not therefore concentrate on those that use wheel chairs as a mobility aid as the only group of people that is disabled.

1.3 JUSTIFICATION OF THE RESEARCH

Managing Universal Design into Construction for a more accessible Ireland for everyone is very important for national development. This is recognition that every citizen has a role to play in enhancing development despite the physical challenges faced in different stages of life and also disability due to accidents and other factors that affect health. If measures are put in place before and during construction of new buildings, the country would ensure that all citizens remain productive hence reducing the dependency level. Involving the construction team in establishing the new building regulations discussed in part M is the only way to ensure that perceived ideas are put into practice. This means that ignoring such a sector would result in failure of proposals that have been developed on the implementation of the new regulations.

The guidelines being reviewed are on Irish buildings and facilities. However, the guidelines are designed in such a way that they are applicable anywhere in the world. Involving the construction team goes along way in ensuring that the implementation of the guidelines is successful since they form a major part of the entire team aimed at ensuring that buildings and the surrounding environment is accessible to all people. This research is aimed at ensuring that the construction team clearly understand the recommendation in part M and the importance of promoting equality in accessibility of building and surrounding environment.

Even though the people who move on wheelchairs, the blind and the sick are considered as impaired, everyone encounters a challenge at one point in their life. As a result, each person will require special equipment at one point which can be avoided by creating an environment that is accessible to all.

2.0 LITERATURE REVIEW:

The main extent of the research was sought directly from the newly published amendments Building Regulations Part M. This was mainly due to the fact that the amendments were published in July 2009. However further factual information relating to the circumstances surrounding the change to the building regulations was sourced directly from Irish government departments, EU departments, United Nations departments and the internet.

In the modern world, many challenges are facing human beings and the changing environment makes it impossible for some to operate freely. In the current financial crisis, development can only be achieved by ensuring all community members are involved in eliminating obstacles that increase the dependency rate. The average figures of disability released after the census done in 2002 are 60% for people aged above 80 years and 40% of people aged above 70 years (NDA 2005). This means that the possibility of being disabled is proportional to the age of a person. However, there are occasions where a child is born with a disability that is sometimes permanent. Others may develop a disability as they grow up. To ensure social inclusion, participation and independence of such people, accessibility is a priority. Anyone can be disabled and is disabled at some point in their life.

It is estimated that 10 % to 15% of the total population of people in Europe are persons with disabilities. These cases mainly result from disabling conditions that are prevalent at old age, accidents, diseases and defective births. The life expectancy in Europe is increasing and this has resulted to the prediction that the number of persons with disabilities is likely to increase steadily in the near future. Different organizations have raised concern especially with the current emphasis of equality and human rights. If a method of ensuring that people are self dependant despite their disabilities is not sought, there is a possibility of increased dependency rate which would mean reduced rate of development. The main emphasis is allowing people with disabilities to fully participate in public life by enhancing chances for them to achieve greater control and choice. The implementation of universal design has been considered as one means of facilitating the promotion of all citizens having equal rights.

People with disabilities were discriminated against when offered employment opportunities as they were thought to be incapable of delivering quality services in the past. The disability Act set in 2005 sought to solve this problem by laying measure on companies and government organizations. Any public organization was expected to promote employment for persons with disabilities with each organization ensuring that 3% or more of all employees were people with disabilities. In 2006, 6% of the total working age population was recorded as people with diverse disabilities. The idea of including people with disabilities in the working environment seems to have been adopted effectively as all organizations exceeded the target by the end of December 2005. This has also increased as the year go by as indicated by 2007 and 2008 data indicating 3.8% and 3.9% respectively of all employees in government departments being disabled.

Universal design has been defined as a strategy that is aimed at ensuring accessibility and use of services, information technology, communication, products and environments by all people to the maximum, with a greater emphasis on the people with disabilities. It is aimed at ensuring maximum use of the above by all people with ease. The Council of Europe is at the forefront fighting for the rights of all people to ensure that everyone has an equal chance to attain his or her full potential. It has therefore taken the role of protecting educational, cultural, social, political and civil rights of people with disabilities through the adoption of common rules in regard to disability.

Fundamental freedom and human rights dictate that persons with disabilities have a right to social participation, integration and independence in the life of any community. Segregating anyone or creating conditions that limit these three aspects is considered as inhuman and a mode of discrimination. Existing buildings have been the major limitation to people achieving their full potential and thus the need for creating an accessible environment for all individuals. Currently, much is being done on creating all inclusive technologies and built environments. The ministerial declaration made in May 2003, in regard to people with disabilities focused on ensuring participation of all citizens in the development process. However, this can never be achieved if certain persons are still excluded from the society.

An accessible environment supports all people including those intellectually challenged, the deaf, blind, those with low vision, children, the aged, pregnant mothers and those who have difficulties in hearing and those extremely tall or short. 300 000 people were recorded as being disabled of which 190 000 had multiple disabilities, 78 000 had hearing and vision problems and 176 000 had disabilities that restricted their physical movement or actions (National Disability Authority 2002). Pregnancy is considered as a challenge since a pregnant woman especially in the third trimester is limited on the tasks she can undertake, mobility as well as the feeding habits.

The building and construction system in Ireland have been operating separately. Though planning may completely comply with the planning regulations, it may not necessarily comply with the building regulation. This has resulted to a challenge in implementing part M and ensuring that buildings are accessible in practice. Accessibility has therefore been considered as a role of the building control system[1]. Any construction project should comply with the building control system for effective results.

IWA has provided guidelines on new buildings and the means to make these guidelines accessible to the entire public. However, this recognizes the importance of stakeholder involvement and has thus given a chance to anyone who might not have been involved in developing the guidelines to give their suggestion hence the guidelines will be reviewed and included in the 2nd edition. Since buildings do not also meet these guidelines, working towards improvement of the building by following the guidelines and urges every other organization to do so. Since there are some conditions in the life of a person that keep on changing, including the surrounding environment, continuous research is important to understand arising challenges and problems.

[1] Lack of involvement of all stakeholders has been the major cause of failure in the implementation of part M. This results to discrimination of the disabled in the use of a building.

Universal design is aimed at ensuring that buildings are accessible to the maximum number of people without using any specialized design or adaptation hence seeks to ensure public inclusion regardless of one's limitations in regard to language, physical and cognitive abilities. The design does not limit its use by people in terms of ability, age or size. Though constructing a universal design is expensive, it reduces the cost that would be incurred in adaptation in an environment. Additionally, a person who was walking uprightly and was considered to be "normal" can have a disability at a later stage in life as a result of accidents and such like incidences.

Inequality in society has been a major cause of slowing development in many countries. This however takes different forms including segregation of a group of people in the population considered as "disabled" as buildings are put up in consideration of the "normal" person (Irish Wheelchair Association 2009). This limits the ability of some people to reach their full potential and become self independent hence promoting development. The developed countries are better than the developing ones since they provide better living conditions than those in developing countries.

In ensuring that buildings are accessible to all, certain considerations should be made. These include use, enjoyment and safety for all. All stakeholders should be considered including the users, constructors, managers and designers. If any of these is neglected, the entire plan of developing and implementing a universal design would fail. External space and the building should be in such a way that anyone can use them. This means that one person should not find it easier to use a building than another. All people should also feel safe when in the building or on the surrounding environment. In case of danger, everyone should have a chance to escape unlike the current situation where only those regarded as "normal" are in a position to escape while those with a certain challenge die in the buildings. This is in recognition that it is not impairment that makes one disabled, rather it is the environment.

The environment we live in has been identified as the major cause of injuries. For instance, accidents account for above 50% of total admissions in children aged below 16 years (Irish Wheelchair Association 2009). However, this can be prevented if the buildings design were made better. The cost of prevention is lower as compared to the cost of treating such injuries which are sometimes irreversible. To prevent fall especially for young children and the elderly, stairs are constructed with short flights and landings. This kind of construction does not however require more space or an extra cost. The government includes all measures that ensure involvement of refugees, travelling community, people with disability, and women in national development. Though the cost of applying a universal access is high, it is not as high as ignoring this principle.

Involving all stakeholders during the construction of a new building or developing an existing one is very important. This is because though the planning may address the issue of accessibility, the building may be practically inaccessible because of failure to address elements which fall under planning regime. Currently, the local authority oversees the building and planning regulations. However, the building regulations include a spot check on fire safety certificates. The new building control Bill which is being drafted is aimed at including compliance confirmation with part M in the design and construction of buildings and thus will demand an access certificate[2].

The disabled population in society has been disregarded when it comes to evacuation from buildings during emergences. As a result, only a few people escape in case of an emergency. The egress policy addresses the issue of evacuation for all people including the disabled. Currently, there is increased emphasis on the importance of ensuring safety for all including during emergency situations so as to ensure social inclusion and participation of the disabled.

[2] Assessing of the planning application should be done in reference to the set objectives and policies which have been set in the country development plan which has been adopted by the group of elected members of Irish local authority.

According to past research, inaccessibility of buildings and surrounding environment has been a major limitation of people achieving their full potential. Despite the high disability rate in the world, only a small portion of these individuals are involved in the white collar jobs. This is clear from research conducted on the involvement of people with disabilities in the broadcasting programs in Ireland. For instance, out of the eight hundred and four programs sampled, only sixty seven had at least a single person with disability. There was however a significant difference between those involved in the radio stations (47%) from those involved in the Television (58%). However, this difference can be accounted for by the difficulty in identifying individuals with disability from the radio stations as compared to those in Television. The indication of this could be that very few people with disabilities qualify for these positions due to various challenges that result from poor environments living and learning conditions including poor building infrastructure. These factors affect the learning process resulting to many dropping out from school or shying off from applying for jobs due to low self esteem.

Since acceptance of universal design requires new a way of thinking, its implementation has failed in many cases due to the lack of information. Naturally, human beings tend to act against a rule until they have enough evidence of perceived benefits. In this regard, both designers and constructors are likely to counteract the implementation of universal design with the argument that it increases their cost of operation. If such crucial people do not understand the importance of implementing a universal design, they will reject it as they are even more comfortable with the systems they are used to. Governments have a role of providing information regarding assistive technology, products, social services and legislative measures to all user organizations and citizens. Public awareness is paramount to ensuring the success of universal design. As a result, the disability action plan targeted to take a span of 5 years (2006-2015) should be looked at as an obvious opportunity for the Council of Europe to create awareness (The committee of Ministers 2009). The member states' governments gave several recommendations on the inclusion of all citizens. The first recommendation concentrated on the participation of all members of a community on the community life. This meant that the principles set on the universal design are practiced and appropriate policies set. Coming up with a solution to the current

situation of inaccessible designs and buildings that limit some people from using it were to be sought. In addition, new designs being created were expected to be in such a way that they do not create any new barriers. Secondly, the integration of universal design principles in practice, legislation and policy is to be guided by advocated measures by the committee of ministers.

Lastly, the application of a universal design while implementing Rec(2006) recommended to member states by the committee of Ministers on the action plan developed by the council of Europe was enhanced. These recommendations included enhancing full participation of persons with disabilities in society and improving their quality of life. Lastly, the committee recommended that dissemination of information to all concerned parties is of great importance. This will be only made possible trough participation of those people with disabilities, co-operation of the governmental organizations with the non-governmental organizations, holding campaigns aimed at creating awareness and stakeholder participation. The main challenge being faced now is how to come up with mainstream solutions which are compatible and adaptable in the current conditions. More people will be covered if specialized services and technology are integrated into the design.

Every solution and policy is directed towards accommodating all people in full community participation hence reducing the increased need for special services and segregated solutions. Universal design is therefore directed towards eliminating any barriers to incorporation or integration regardless of whether it is architectural, urban, professional, social, cultural, family-related, educational or psychological. Universal design would strengthen the European goal which is to enhance people's autonomy and ensure that they are independent through definition of a European policy that touches on integration of those people with diverse disabilities in community affairs.

In coming up with a universal design, various aspects are considered. The disabilities considered include mobility problems, deafness or challenges in hearing at certain frequencies, poor eye sight or blindness, poor grip to objects and services, breathing problems among others. If all people with these challenges are considered, the world would develop to accommodate all people and transform their lives by ensuring their involvement in society. Research is the only way to discover any existing gaps in inclusion of all people in public affairs. This design if adopted will speed up the attainment of the millennium development goals as it is in line with the goals.

2.1 LIMITATIONS OF THE RESEARCH

This research does not consider those people who are mentally and intellectually challenged.

3.0 RESEARCH METHODOLOGY

The method used is review of secondary data from reliable government institutions and non governmental institutions.

3.1 RESEARCH DESIGN

The research design applied is descriptive research because the research involves an estimation of the relationship that exists between variables. This is because the data being collected included both quantitative and qualitative data. A time frame of 1 year was required to complete the research so as to ensure a wide coverage. Qualitative data was coded so as to develop a quantitative statistical data for analysis. The study was a descriptive study in which different variables were explained and their relationship with inclusion of people with disability in community participatory activities with the main focus on constructors and designers. Only past scientific researches were used since they are objective, precise and had a high accuracy level. Some questionnaires were used to gather information from the stakeholders and the information later analyzed to draw conclusions.

3.2 SAMPLING

The sampling method applied was random sampling. Data from relevant samples of all ages were used. Only those mentally challenged and the young children were excluded from the sample and data. Young children were not involved in this research since they are considered to lack the will power. This reduced biases in sample selection. However, participants voluntarily participated in this process with persons involved with managing institution that deal with people with disabilities being main participants. Selected samples were informed on confidentiality and study purpose of information collected.

3.3 DESCRIPTION OF STUDY POPULATION

The study population comprised of persons with disabilities, designers, construction team, policymakers, organizations dealing with persons with disabilities and local leaders based in Ireland. All persons who were used in the pre-test had the same characteristics with the study population but were not involved in the actual study. The findings were drawn from researches done in the period between 2007 and 2009. However, data collected in other years was also utilized so as to draw comparison. The research completely depended on the samples collected for past researches.

3.4 QUESTIONNAIRE/SURVEY

A Survey was used to get views from professionals within the construction industry in order to investigate the understanding of designers when implementing universal design into construction projects. The survey was distributed around numerous design companies. This survey was used to show how Universal Design is incorporated into a company's design process on new build developments. The information gathered provided both qualitative and quantitative data which illustrates the respondents' opinions and perceptions on the subject.

3.4.1 SAMPLE STRUCTURE

It is important to note that this questionnaire will only give the views and opinions of a section of designers/professionals working in the construction industry in Ireland at present. It is not intended to represent an entirely accurate proportion of those people but merely a sample size of 52 people.

The objective of the sample size was to get an overall opinion regarding the adequacy and control of the building regulations and guidelines concerning access for people with disabilities.

3.4.2 DISTRIBUTION OF THE QUESTIONNAIRE

The questionnaire was distributed by email to 52 addresses in total which included professionals currently working in construction/design offices in Ireland.

Table 1.0 summarises the research sample response rate achieved. A total of 30 responses were received. This represented a response rate of 58% as indicated in Table 1.0.

Questionnaires Issued	Responses	Response Rate %
52	30	58

Table 1.0 *Table showing gender of the sample size of professionals who completed the survey on 'Professional Designers opinions on Universal Design'*

3.5 CASE STUDY

In order to highlight the importance of implementing Universal Design in Ireland the author was involved in the 24 hour Universal Design Challenge which took place on the 4th – 5th of November 2009. This event was organised by the NDA (National Development Authority), TrinityHaus and CEUD (Centre of Excellence in Universal Design). The main organisers were Dr. A. Fennell (TCD), J. Hubbard, N Murphy (NDA/CEUD) and Professor Ruth Marrow (Queens University). The purpose of this research was to work in an environment focusing on designing a product for people with disabilities that is accessible for the general public also. This was achieved by teaming professionals from all areas of design (Architecture, Engineering, Graphic Design and Web Design) into five teams. Each team was made up of professionals and members of the public who currently live with a disability. The aim of the challenge was to provide all members with an understanding of the importance of Universal Design from all points of view and to promote public awareness.

This report looks at the student's involvement and experiences of the challenge and how Universal Design was achieved on their team's contribution to the challenge.

There were five teams set up with a variety of design disciplines. Each team was given their own conference room were they were to come up with a design idea over the next 24 hours. Team members were introduced to each other and given an itinerary and a map. They were each assigned a different route through the city. All teams were assigned a design sponsor who was a member of the public with a disability, to help identify obstacles and problems.

Each teams design idea was to be designed and presented to a team of judges and the members the public. All teams worked throughout the night to come up with a solution based on their experiences to fulfill the principles of universal design.

'Team A' consisted of Engineers, Web Designers, Graphic Designers, Lecturers, an Architect, Genny (a blind girl from Italy) and students. Team A's research area was a section of Abbey Street between Liffey Street and Capel Street.

Fig.1.0 *Showing: 'Team A' walking Abbey Street with Genny along the Luas Line.*

Team A first walked, photographed, observed and got inspiration on how inaccessible to everyone it is. The team members walked through the area; observed the accessibility and took several photographs.

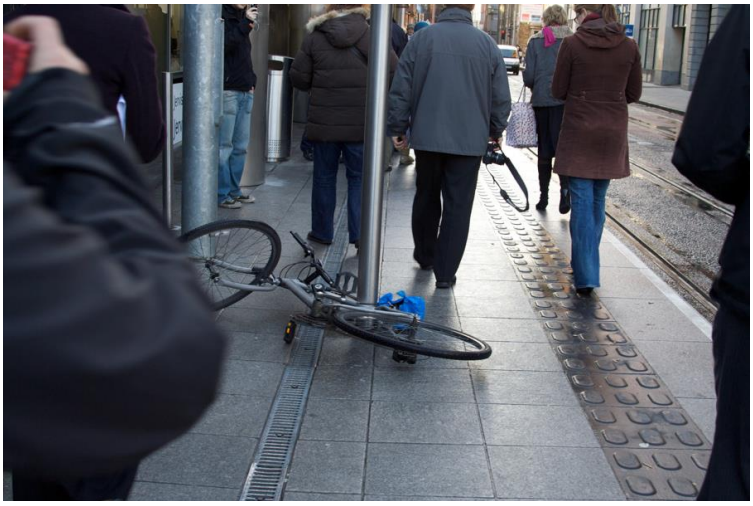


Fig.2.0 *Showing: Obstacles encountered along route.*

Fig.3.0 *Showing Team A: Learning to walk with a blind cane*

When the team returned to their conference room, they were challenged to come up with an idea from their experiences. Everyone on the team had strong personalities and differences of opinions were inevitable but everyone had fun and everyone's points of view were heard. It was agreed that it is not possible to re-design Dublin City so an aid for people to get around using the easiest route for them was their solution.

Fig.4.0 & 5.0 *Showing: 'Team A' coming up with the idea through the night.*

'Team A' discovered that a user friendly device for anyone with disabilities but not exclusively for people with disabilities is a required object in today's built environment for accessibility and getting around the City. The team worked through

the night and agreed on a device, a GPS system with an on-line profile account. This device updates users' routes which they can review their progress online.

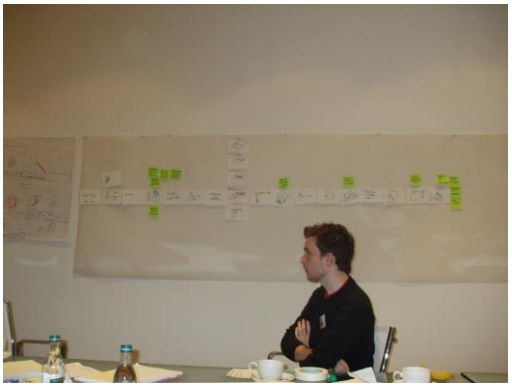


Fig.6.0 & 7.0 *Showing: 'Team A' Putting together the presentation.*

The next morning all teams had to submit a 7 minute presentation and description of the product which was held in the Hub, Guinness' for presentations and awards. There were two prizes, the Judges Choice Award and the Peoples Choice Award. 'Team A' won the peoples choice award which all the other team members and audience (150 people in total) voted for.

Fig.8.0 *Showing Team A: winners of the Universal Design Challenge Peoples Choice Award 5th Nov. 2009.*

The result of the study proposed a device to help those with disabilities to cope better with the existing built environment, rather than looking at redesigning it completely. The thrust of most of the legislators at local, national and international level is to improve the built environment for universal access. Concentrating on upgrading the people, to make life more accessible to them, rather than accepting they have disabilities and changing the environment to suit them.

Please see Appendix B: Students presentation on 24 Hour Universal Design Challenge for the All Ireland Symposium on the Built Environment Education (AISBEE), University of Ulster 2010.

3.6 QUESTIONNAIRE/SURVEY ANALYSIS

3.6.1 METHOD OF ANALYSIS

The results of the questionnaire are presented in detail in Appendix B using tables and charts. All of the questions were analysed using a table to illustrate the results and a sample charts to put those results into a graphical format. These charts show percentage figures for the responses to the questions, thus making it a lot easier to analyse the data.

3.6.2 QUESTION SELECTION

In order to decide on what kind of information was required from the respondents, a combination of close-ended questions with ordered choices and close-ended questions with unordered choices. These questions were kept short and simple to facilitate a good response.

3.6.3 ANALYSIS OF RESULTS

The author adopted a specific method for analysing the results. This included the following steps:

Step 1: Restate the question.

Step 2: Present the results from that question in a tabular or graphical format.

Step 3: Comment on and interpret the results.

PROFESSIONAL DESIGNERS OPINIONS ON UNIVERSAL DESIGN

QUESTION 1

What is your gender?	
Answer Options	**Response Percent**
Male	80%
Female	20%

Table 2.0 *Table showing gender of the sample size of professionals who completed the survey on 'Professional Designers opinions on Universal Design'*

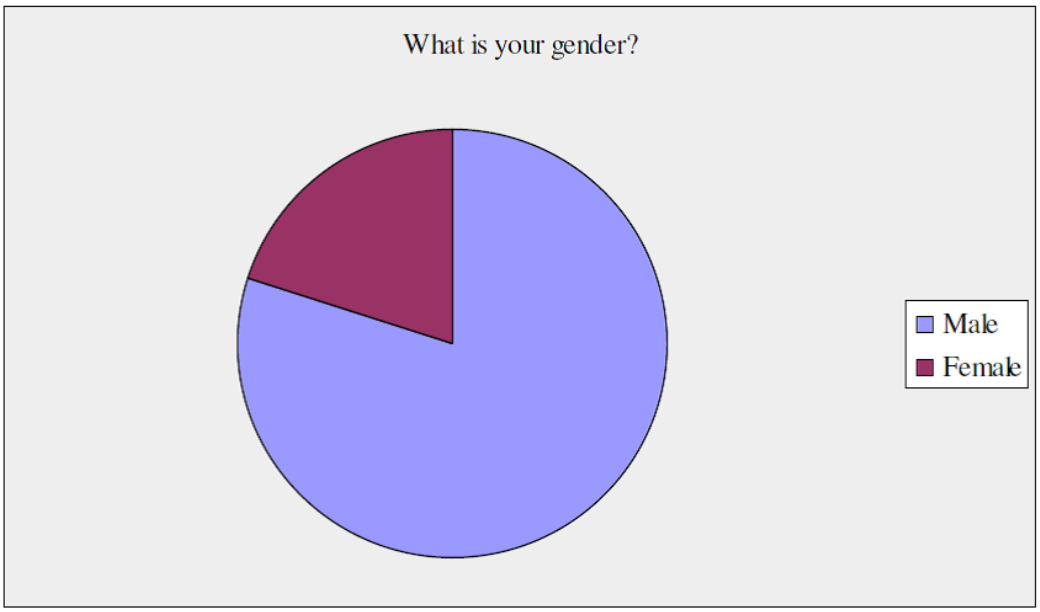


Fig. 9.0 *Graph showing gender of the sample size of professionals who completed the survey on 'Professional Designers opinions on Universal Design'*

Table 2.0 & Fig. 9.0 Question 1 shows 80%-20% is the male/female ratio of participants of design professionals in the Irish construction industry at present.

QUESTION 2

Which area of construction do you presently work?	
Answer Options	**Response Percent**
Architecture	20%
Engineering	36.7%
Quantity Surveying	16.7%
Other (please specify)	26.7%

Table 3.0 *Table showing areas of the Design professionals who completed the survey on 'Professional Designers opinions on Universal Design'*

Table 3.0 & Fig.10.0 Shows the percentage of areas where design professionals work in the Irish construction industry at present; 20% architecture, 36.7% engineering, 16% quantity surveying and 26.7% of participants in areas such as Project Planning/Management, education and planning.

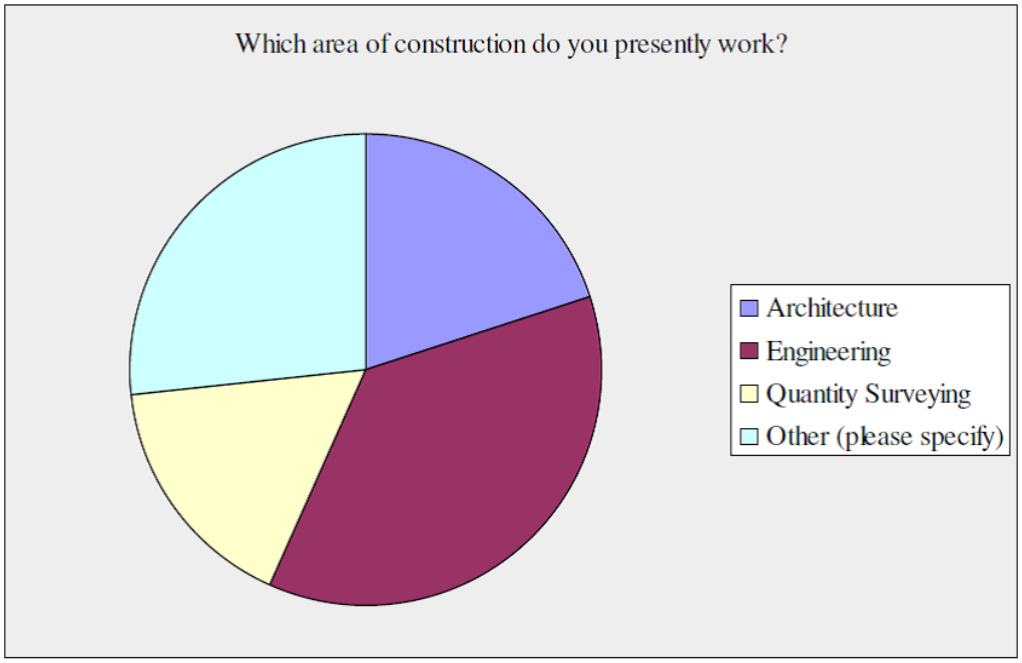


Fig. 10.0 *Graph showing areas of the Design professionals who completed the survey on 'Professional Designers opinions on Universal Design'*

QUESTION 3

Are you familiar with Technical Guidance Document Part M - "Access for people with Disabilities", and that they are presently being reviewed by the government to be released in July 2010?	
Answer Options	**Response Percent**
Yes	80%
No	20%

Table 4.0 *Table showing awareness Design professionals who completed the survey of part M of the Irish Building Regulations of the on 'Professional Designers opinions on Universal Design'*

Table 4.0 & Fig.11.0 From analysis of results, it is shown 80% of the participants were familiar with the regulations and aware they will be reviewed and released in July 2010 while 20% said they were unfamiliar with TGD Part M.

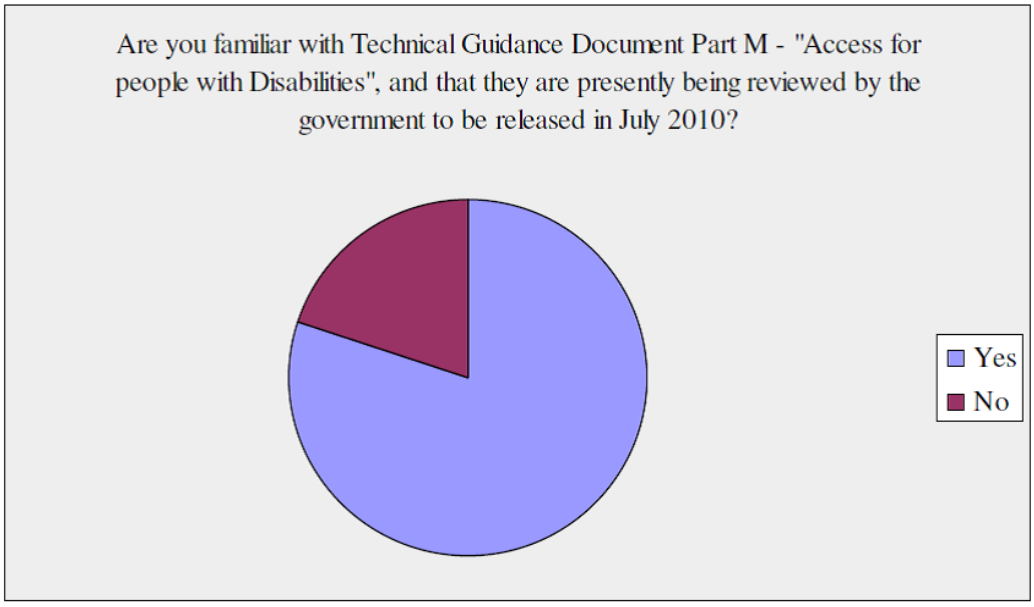


Fig 11.0 *Showing awareness Design professionals who completed the survey of part M of the Irish Building Regulations of the on 'Professional Designers opinions on Universal Design'*

QUESTION 4

Do you use any other references or standards in accordance with TGD Part M?	
Answer Options	**Response Percent**
No	70%
Yes (please specify)	30%

Table 5.0 *Table showing if other references are used by Design professionals who completed the survey of the on 'Professional Designers opinions on Universal Design'*

Table 5.0 & Fig.12.0 From analysis of results, it is shown 70% of the participants do not use any other references in accordance with TGD Part M. The 30% who do use other references use; ETCI Regulations, British Standards, TGD Part B & K, Building for Everyone – NDA and British Part M.

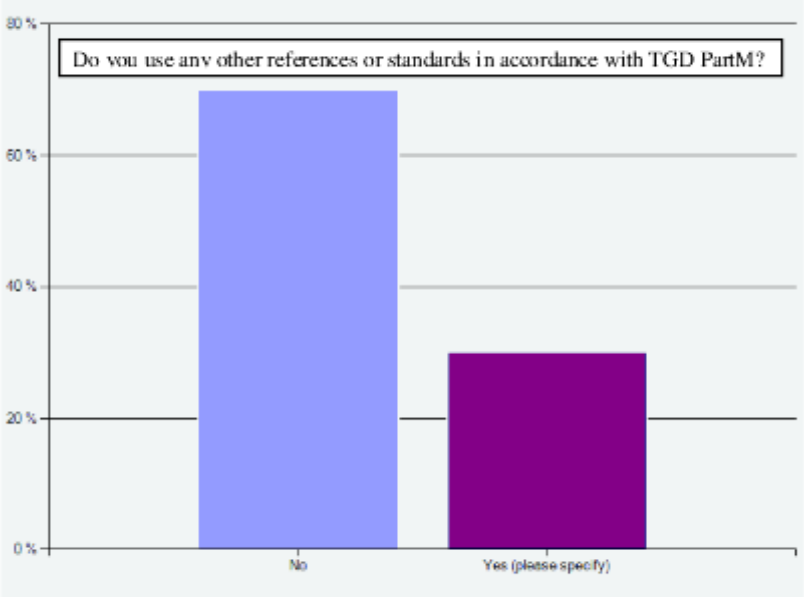


Fig. 12 *Showing if other references are used by design professionals who completed the survey of the on Professional 'Designers opinions on Universal Design'*

QUESTION 5

Do you feel that Technical Guidance Document Part M meets the requirements for majority of people with disabilities?	
Answer Options	**Response Percent**
Yes	40%
Don't Know	43.3%
No (please explain)	16.7%

Table 6.0 *Table showing if design professionals' opinion on requirements met for majority of people with disabilities, survey; 'Professional Designers opinions on Universal Design'*

Table 6.0 & Fig.13.0 Shows 40% of the participants believe that TGD Part M meets the majority of requirements for people with disabilities but 43.3% do not know if they do or not. 16.7% do not believe requirements are met and could be improved and developed further.

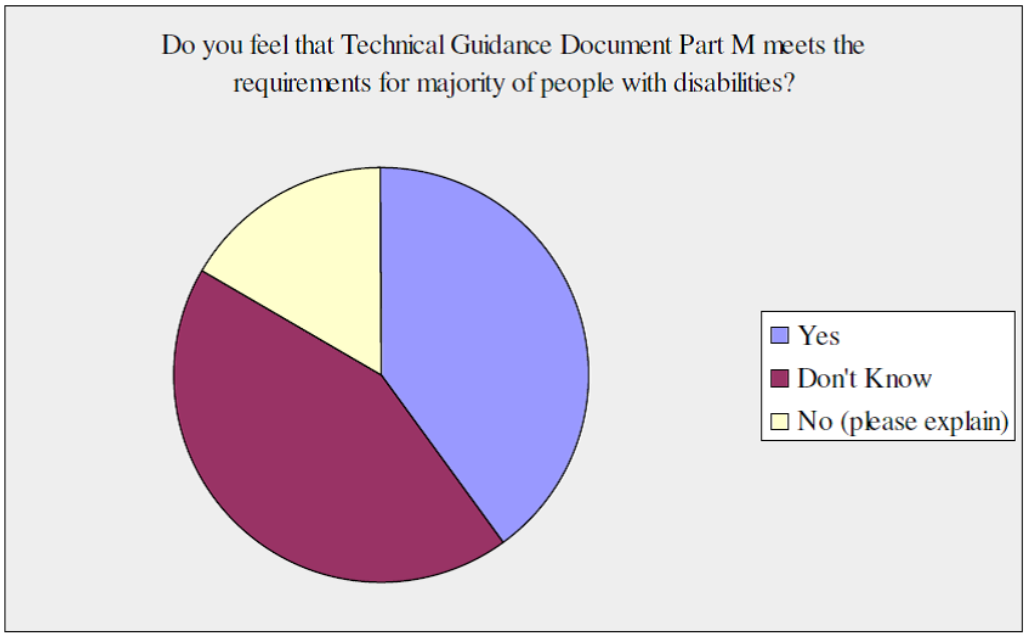


Fig 13.0 *Showing if design professionals' opinion on requirements met for majority of people with disabilities, survey; 'Professional Designers opinions on Universal Design'*

QUESTION 6

Which impairments do you believe are catered for in Technical Guidance Document Part M?	
Answer Options	**Response Percent**
Mobility	73.3%
Visual	36.7%
Hearing	23.3%
Cognitive	3.3%
All	26.7%
None	0.0%

Table 7.0 *Table showing if design professionals' opinion on which impairments of people with disabilities met, survey; 'Professional Designers opinions on Universal Design'*

Table 7.0 & Fig.14.0 The majority of the participants (73.3%) believe that TGD Part M caters for mobility impairments, 36.7% visual, 23.3% hearing and only 3.3% cognitive. 26.7% believe that all areas of mobility; visual, hearing, cognitive are catered for.

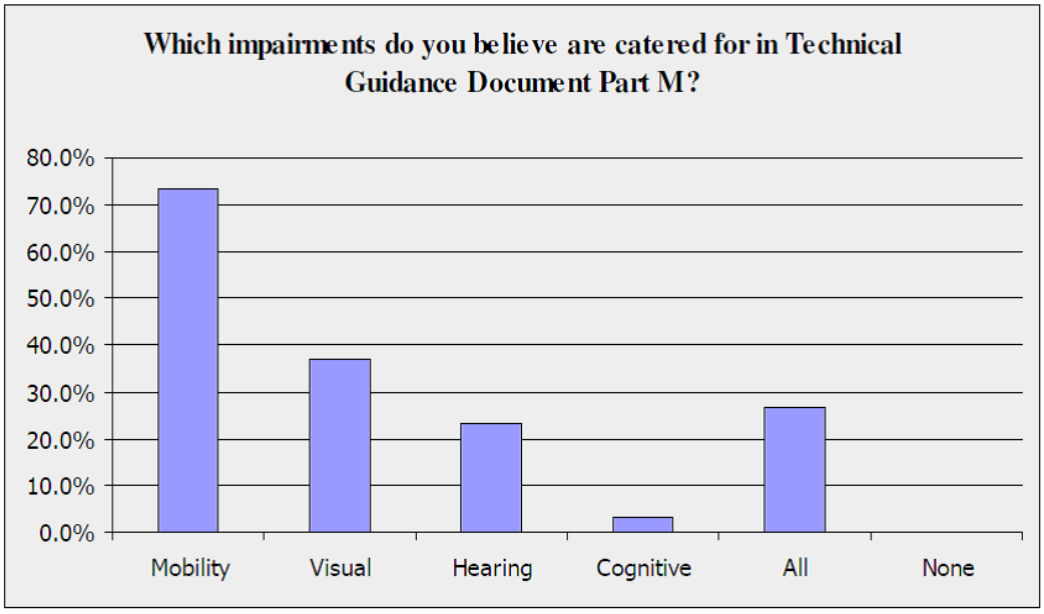


Fig 14.0 *Showing if design professionals' opinion on which impairments of people with disabilities met, survey; 'Professional Designers opinions on Universal Design'*

QUESTION 7

How often does accessibility form part of your Project Brief?	
Answer Options	**Response Percent**
Frequently	43.3%
Sometimes	40%
Never	13.3%
Not Relevant	3.3%
Comments	

Table 8.0 *Table showing if accessibility form part of their project brief of design professionals, survey; 'Professional Designers opinions on Universal Design'*

Table 8.0 & Fig.15.0 Show 43.3% of the participants stated that accessibility forms part of their project brief, 40% state sometimes and 13.3% state it is never part of it.

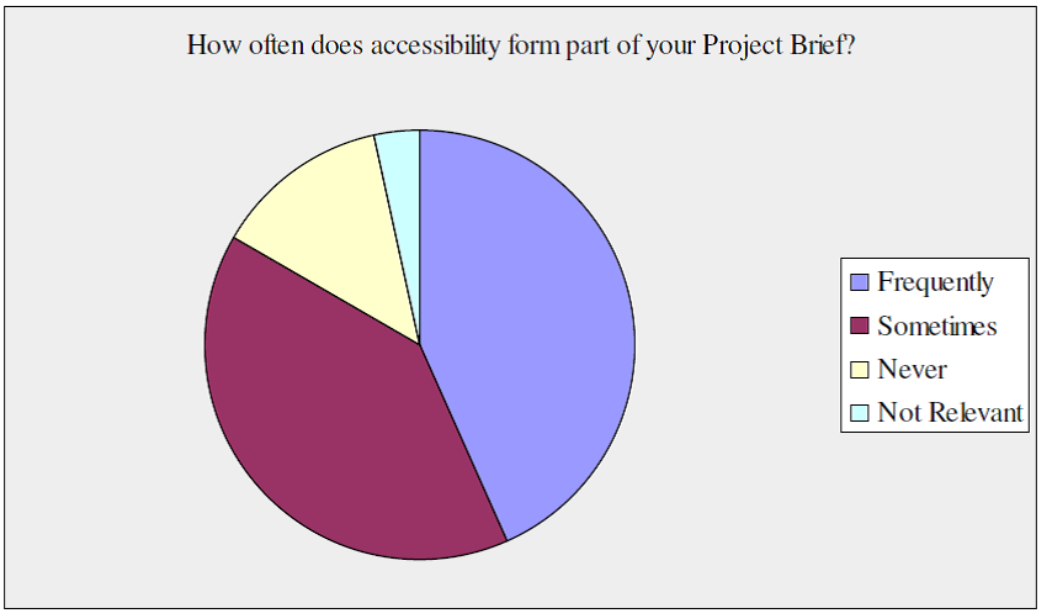


Table 15.0 *Showing if accessibility form part of their project brief of design professionals, survey; 'Professional Designers opinions on Universal Design'*

QUESTION 8

In your experience, where do you believe the most problems occur with regard to accessibility within the built environment?	
Answer Options	**Response Percent**
Access	60%
Circulation	56.7%
Sanitary	20%
Other (please specify)	6.7%

Table 9.0 *Table showing opinions of design professionals on problems with regard to accessibility, survey; 'Professional Designers opinions on Universal Design'*

Table 9.0 & Fig.16.0 The majority of participants believe that the most problems occur with access and circulation of accessibility within the built environment. 20% believe sanitary cause problems and 6.7% believe lack of space visually impacts on the design of accessibility.

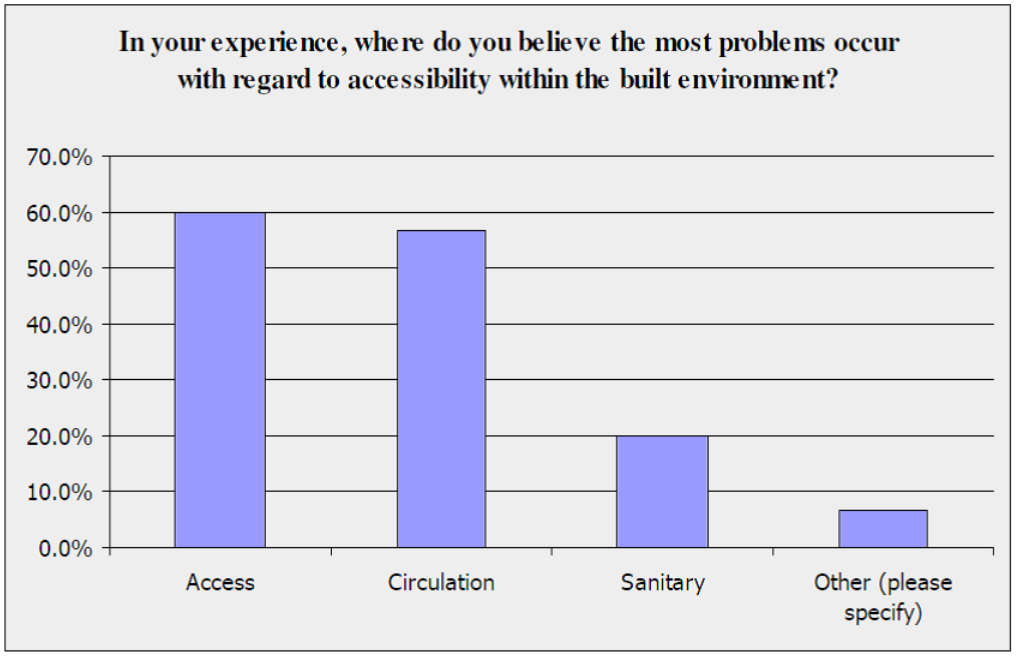


Fig 16.0 *Showing opinions of design professionals on problems with regard to accessibility, survey; 'Professional Designers opinions on Universal Design'*

QUESTION 9

How often is the issue of accessibility raised during pre-planning meetings with the Local Authority?	
Answer Options	**Response Percent**
Frequently	26.7%
Sometimes	53.3%
Never	10%
Not Relevant	10%

Table 10.0 *Table showing design professionals on how often accessibility is raised during pre planning meetings with the Local Authority, survey; 'Professional Designers opinions on Universal Design'*

Table 10.0 & Fig.17.0 The majority of participants (53.3%) state that the issue of accessibility is raised during pre-planning meetings with the Local Authority. 26.7% state it is frequently raised and 10% state it is never raised.

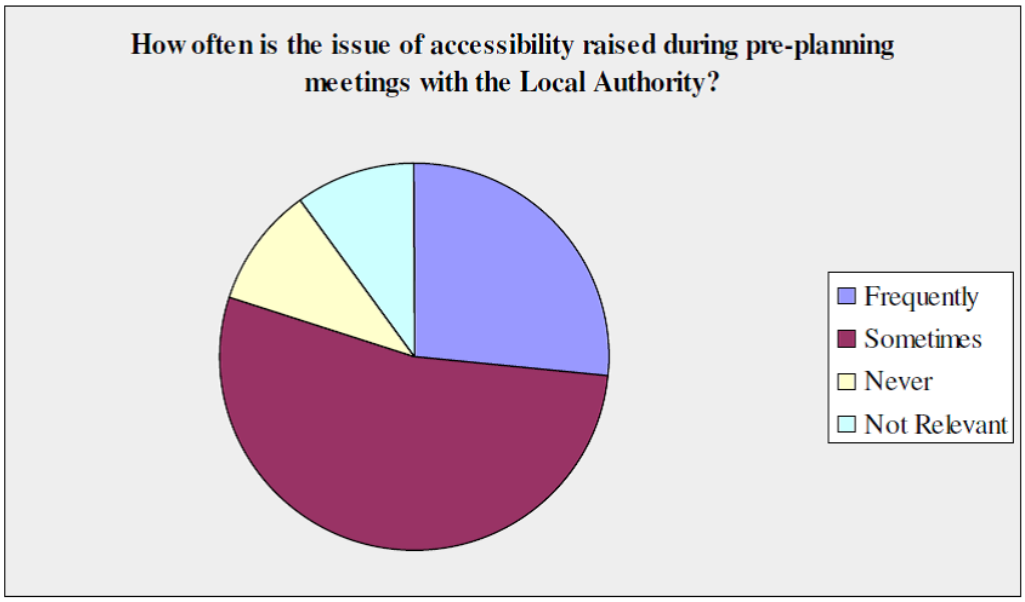


Fig 17.0 *Showing design professionals on how often accessibility is raised during pre planning meetings with the Local Authority, survey; 'Professional Designers opinions on Universal Design'*

QUESTION 10

In your own experience; are the standards stated in Technical Guidance Document Part M being enforced by Local Authorities?	
Answer Options	**Response Percent**
Yes	63.3%
No (please explain)	36.7%

Table 11.0 *Table showing opinions of design professionals TGD Part M being enforced by Local Authorities, survey; 'Professional Designers opinions on Universal Design'*

Table 11.0 & Fig.18.0 The majority of participants (63.3%) state TGD Part M is being enforced the Local Authority. 36.7% state it is not being enforced and comments were made on the reason for this is the lack of building control in Ireland.

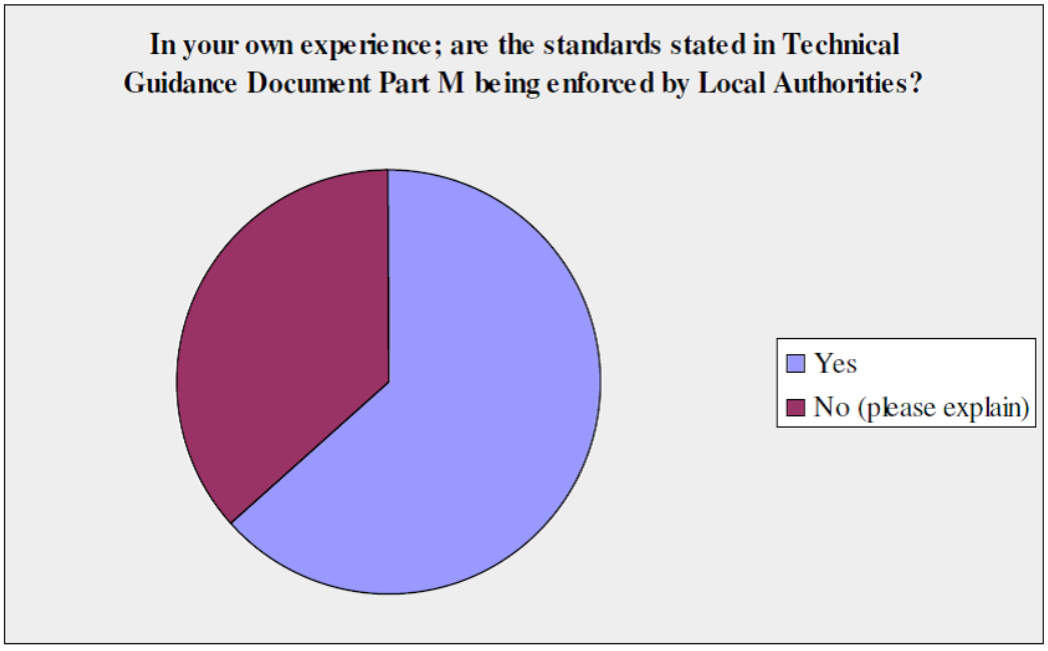


Fig 18.0 *Table showing opinions of design professionals TGD Part M being enforced by Local Authorities, survey; 'Professional Designers opinions on Universal Design'*

3.6.4 ANALYSIS OF RESULTS CONCLUSION

Overall the majority of professionals who took part in the survey were very familiar with Technical Guidance Document Part M. For clarification of the standards, some professionals use other references in accordance with TGD Part M such as the British standards, British Part M, ETCI Regulations, TGD Part B & K, and Building for Everyone – NDA.

In general there is a lack of knowledge on whether TGD Part M meets the requirements of people with disabilities as 43.3% of the participants stated they did not know if requirements were being met by the regulations.

Access and circulation problems occur due to the lack of space available in the majority of existing buildings.

Results show that accessibility generally forms part of the pre-planning meetings with Local Authorities but 36.7% of the participants believe accessibility is not being enforced due to lack of building control.

The case study explored the possibility of a handheld device to help those with disabilities cope better with the existing built environment, rather than looking at redesigning it completely to make life more accessible to them. This way is accepting that they have disabilities and changes the environment to suit them.

4.0 FINDINGS

4.1 TYPES OF DISABILITIES

4.1.1 MOBILITY

The mobility of a person differs throughout their lifespan. This is affected by accidents, sickness, health, activity or age. It can be reduced during pregnancy or old age and also increased in the case of an athlete. Impairment in mobility can be permanent or temporal, significant or mild. The "normal" person may also find it difficult to walk in some environment when carrying a heavy load. Impairment can be significant to the level that an individual cannot move independently. Those whose mobility is impaired require space, comfortable finish, detailing of stairs, ironmongery and comfortable floor finishing. These considerations to not only address the need of the people who use a wheel chair but many more. During construction, ramps in corridors and handrails should be put in place in addition to floor finishes that are slip resistant to aid mobility. TGD Part M indicates the required space requirement for people with mobile impairment and who use different facilities to aid their movement from one place to another including turning. For instance, a person who cannot move independently but requires assistance by another to push the wheel chair requires minimum space of 750X1200mm. This space is enough to facilitate feet when they extend beyond the footplates and clearance of hands at the sides. To take a 360° turn, a diameter of 1800mm is required. All these details are important when constructing a building. This calls for the designers to work hand in hand with the constructers since unclear details will result to coming up with buildings that are inaccessible to others.

Please see Appendix C: indicating space requirement for people with mobile impairment @ Guidance Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.

4.1.2 HEARING

There are different forms of hearing impairments. These range from people who have a problem hearing particular frequencies to those who cannot hear certain speech levels. This also includes those with acute hearing problems and the deaf. Some have been able to overcome this challenge through lip reading or use of sign language. Lip reading however becomes a challenge if the person speaking is screaming, shouting or speaking a language foreign to the person with disability. To accommodate such people, the building should be designed and constructed in such a way that there is adequate lighting since they rely on their sight for communication. In addition, a public system can be used and buildings be fitted with infra-red system or an audio induction loop to ensure that people in the building receive amplified sound. Text telephones are important for those people who are completely deaf as they allow transmission of information into written form. A combination of visual and audio system can be considered during construction in areas where announcements are likely to be made so as to ensure that those with hearing impairment are not left out. Buildings where large numbers of people meet such as churches should have audio induction loops and banks should be constructed with counter loops.

4.1.3 VISION

The population of people in Ireland includes people who are partially or totally blind and those who use spectacles to aid movement. Such people can also use a white cane or a guide dog to aid their movement. However, these aids are limited in that they do not detect hanging objects, low hanging signs among others. The surfaces should not be serrated or griddled as this would distract guide dogs. Since some visually require someone to walk in front of them or by their side holding the hand of the guide, more space is required. At least a width of 1200mm when passing through the restrictions is required. During construction, positioning features strategically is important to aid mobility of the visually impaired people.

4.1.4 BREATHING

Some people are impaired by synthetic material, pollen grains or smoke. Since majority stay indoor for a longer period than they spend outside, constructors should ensure that there is quality indoor air. These people are important in society and have skills and talents that are necessary in Irish development. As a result, they should not be discriminated from the "normal" people by constructing building with materials or a design that they cannot withstand. At least one in every seven persons is affected by the gases and dust released into the atmosphere. Industrial buildings should therefore be constructed in such a way that the air released into the atmosphere is clean. This has been achieved to some extent but much more needs to be done. The construction team should therefore consider furniture and floor finishes ensuring that they inhibit dust and are easy to clean. Synthetic-based ceiling, floor and wall finishes, including toxic timber treatment or preservatives contribute to the release of gases into the atmosphere. In this regard, details that make cleaning difficult or gather dust should not be included in the new buildings. In addition, application of alkyd-based paints should be done in a controlled manner.

4.1.5 GRIP

A person's ability to have a firm grip on a surface such as a switch, taps, or doorknobs can be reduced over time. This can be caused by a sickness, age, injury on the hand or any other impairment. The buildings should therefore be constructed in such a way that these people, including children, are in a position to operate freely in the buildings. For instance, installing automatic doors or lever-operated handles on the door can be used by everyone. Corridors, ramps, and handrails on a building's stairs should be constructed in such away that they are easy to grip or hold. Switches should also be fitted within the reach of everyone and should be easy to operate.

4.1.6 HEIGHT

The design of a building should put into consideration people of all sizes including those using a wheel chair and children. This involves decisions on the levels of construction of facilities such as sanitary facilities. These facilities should therefore be levelled in such a way that they favour all people and not necessarily low. In this regard, the construction team should clearly understand how different people are vertically challenged and construct a facility in a way that everyone will be comfortable using them regardless of their height when standing or using mobility aids such as a wheelchair. For instance, visually impaired persons are disadvantaged if there are low beams on the stairs. The eye level of building users should also be considered when fitting window transoms, mirrors and signs. In order to accommodate a wide range of people, shelves should be constructed at a height of between 700 and 1300mm while switches are constructed 900-1200mm above the level of the floor (Lacey 2004). This calls for the designer to work closely with the construction team to ensure that all people are comfortable using a building and any other facility within the building and its environment[3].

4.2 PART M.

Part M does not exempt certain buildings and hence applies to all buildings material alterations and extension of existing building. However, it does not include domestic alterations and extensions. Though this part may also apply in material change as used in a building, it does not necessarily have to be applied. By 2015, public offices and public areas must have met the accessibility standards as set in part M (National Disability Authority 2009). Disabled people should never be discriminated in the provision of services and goods though this has not been fully

[3] Including dual counters in buildings will accommodate all range of people. The head height should have the tallest person in mind while different heights are used for the sinks, switches and tables.

achieved in Ireland. According to 2002 Equal status Act, certain buildings will be required to reach the minimum standards[4].

Part M dictates that non-domestic buildings should be accessible to people considered as disabled and should be constructed in such a way that these people can access all facilities within the building. As a result, all facilities are required to be at the same level with the living room though in some circumstances, buildings can include marionettes and apartments that are only accessible by stairs. Part M relates to the construction and design of buildings and addresses the issue of accessibility of buildings and the surrounding environment for people with various types of disabilities. In 1990, the regulations were pertain the BCA (Building Control Act), amended in the year 1997 though they had been enacted in 1992. This part was revised in 2000 and was made applicable to all buildings. This demands that all buildings including domestic buildings should be accessible by all people including the disabled visitors. The disabled should therefore access the WC facilities in a building and they should be able to access and approach the dwellings including the habitable rooms. In some cases, the rooms and the WC facilities are not on the same level. As a result, certain standards have been set to facilitate the accessibilities of such facilities by the people who have disabilities. However, there must be a WC located at the same level with the living room. Houses that were built after the first day of January in 2001 were to have a WC on a level access and downstairs. The architect has a role of ensuring that a building suits the part M regulation so that what is written on paper is implemented in a real life situation and made practical. The TGD (Technical Guidance Document) explains what is referred as practical and adequate in regard to the building regulations. There are several requirement of part M aimed at ensuring accessibility of buildings.

[4] Reasonable accommodation should be made for people with various disabilities as required by the Equal Status Act.

4.2.1 ACCESS AND USE: M1.

The building should be put up in such a way that it allows people with disabilities to independently and safely access and use the building and its facilities. However, this is not applicable in the maintenance, repair and inspection of old buildings unless a new habitat is being created (Statutory Instruments 2009). Part M avoids the definition of disabled persons as it seeks to include all people including children and women. The revision done in 2004 brings parts of Building regulations with part M by extending the scope of part M to include certain changes and alterations done to buildings. Approved documents of part M give practical guidance in relation to the regulations. [5]

4.2.2 SANITARY CONVENIENCES: M2.

People with disabilities should be considered when making sanitary provisions in a building. Convenience in accessing and using sanitary provisions should be considered when the sanitary facilities are being put in place. During construction, the location of places where such materials will be located should be considered.

4.2.3 SPECTATOR OR AUDIENCE FACILITIES: M3

In a case where fixed sitting are put in place for spectators or audience, consideration should be made for the disabled. This means that such places should be accessible by the disabled without requiring them to use any special facilities.

4.2.4 DEFINITION: M4.

Part M defines people with disabilities as those who have any form of impairment that limits their walking, sight and hearing ability, or those having an impairment that limits their ability to walk hence limiting them to the use of a wheel chair.

[5] The ADM (Approved Document M) gives the guidance on constructing and designing building in manner that they are made accessible by all. This document was published in 2003.

4.2.5 APPLICATION OF PART M: M5.

As long as work does not create a new place of dwelling, part M does not apply when creating extensions and altering materials. However, old buildings are still useful to the disabled and an accident may cause a person already using the building to suffer a disability. Sections I and 2 deals with the guidance on all buildings excluding the dwellings, part three concentrates on spectator and audience facilities[6]. Part M does not apply to the extension of a building in regard to the access roots unless the extension is in a way that it makes the existing situation worse. For the non-domestic parts, part M is applicable for extension in any other part apart from the access roots. When exiting cinemas, educational halls, hotels and such public gathering places are being extended, an alternative accessible entrance should be created to support people who wish to access the building and its facilities but use wheel chairs to enhance mobility (National Disability Authority 2009).

At times, a building's use may change. For instance, a shop may cease to be a shop and instead be used as a hotel. Part M does not apply in such circumstances unless there are alterations to be made in the building which is the case in most cases when there are changes in the use of a building. Materials change of use is different from change of use in planning and development regulations. There are minimum and desirable measurements that have been put in place and act as a checklist of whether a building complies with part M making the building accessible to all. However, the minimum requirements fail to meet the needs of some people. Please refer to appendix D For example of tables showing different measurements.

[6] If in a dwelling the floor location area of WC is above 45m2, set guidelines dictate that the space should be large enough to allow a disabled person using a wheel chair to enter the WC and close the door. In case it is less than 45m2, the space should be sufficient to allow the person to enter and move from the wheel chair to the WC.

4.3 UNIVERSAL DESIGN

Universal design was authored by a group of designers, architects, researchers in environmental design and engineers who established some principles to be followed by all (NC State University, 1997). Their main aim was to design environments and products to be used to the maximum by all people without having to make some adaptation or create some specialized designs. It is a way, which is more effective, and which is used to improve the quality and accessibility of built environment, products and services. The main aim of creating universal design was to make composition and designs of various products and environments usable by, understandable and accessible to all. This would grant everyone, including the disable, a chance to fully participate in the political, public and cultural life, be able pass and receive information thus fully communicating, participate fully in learning/education and in the employment sector, have easy access to buildings among others. The design aims at achieving this without having to work with adaptations or looking for special solutions (Garabagiu, 2008).

Universal design is aimed at achieving this without creating more barriers. It has four outline steps of work: adopting and deciding. This mainly involves deciding what needs to be done in a particular case to aid the people, especially the disabled, to access all the facilities within a certain area. The second step is coordination to ensure that all that is needed to adopt the particular change is available. This may include the manpower and other resources. The third step is implementation of the decided changes and after that the evaluation to decide whether it is successful of not.

Universal design has been broken down into seven simple principles which are discussed below (NC State University, 1997). These outlined principles, which act as the guide, can not only be used in building new designs but also in doing some evaluations on the already existing ones. In addition, they can be of educational use to the designers and consumers about how the most suitable building should be. The first principle of universal design is that the building should be of equitable use. This means that it should be useful and also marketable to people visiting and living in Ireland of diverse abilities. They should not favor ‘normal’ people while

discriminating those that have disabilities. The design should be all inclusive in way that it provides similar means of use for all who are to use them. This will ensure that there is no discrimination or segregation of whatever kind to some people who may have a physical challenge. In addition to attaining this, the security, privacy and safety provided while putting up any building should be equal and readily available to all the users of the particular facility. This principle also calls for the design in question to be appealing to everyone who uses it.

The second principle of the universal design states that flexibility in using the particular facility should be ensured. This basically means that the particular building design should accommodate a variety of individual abilities and preferences. There should be no one shut out of accessing and using the particular building due to some physical challenge. To attain this, the building should have a variety in the facilities put in place to ensure that there are some options for the users[7]. For instance, the extent to which one is old affects the pace of the person and the facilities put in place should be able to adapt to cater for that.

The third principle states that the particular measures put in place in a building should be simple to ease use. This includes ease to understand how to use despite the user's knowledge, experience, and language use and/or concentration level. Any complexities which are unnecessary should be eliminated and there should be consistency in line with the user's intuition and expectations. The measures put in place should also accommodate everyone despite their literacy level and skills in language. The information provided in these facilities should be arranged in order of importance starting with the most important. These arrangements should be made in a way that the uses are aware to ease their access and use. It is also important to have in place effective ways of prompting and giving feedback during a task and after it is complete. For instance, if it is in a lift, there should be a way of informing the people using it, especially those with visual or audio impairment, what floor they are in, when the door has opened and when it is about to close[8].

[7] The disabled should be in a position to make accurate or precise choice without much difficulty. The facilities should ensure adaptation to the user's pace.
[8] The facilities needed to enhance communication should be put in place during construction as this is cheaper than implementing after building have already been put up.

The fourth principle is perceptible information. This means that all the necessary information should be passed on in an effective way to the user regardless of the kind of physical challenge that he or she suffers. In this case pictorials can be used for the deaf while clear verbal communication can be used for the blind. These different modes may be communicating the same this but the redundancy is necessary to cater for all users. This information should be placed at a point that everyone, including those that use wheel chairs, can see it without having to struggle. This can be achieved through providing enough contrast between the particular information and the surrounding.

Universal design's fifth principle is tolerance for error. This principle states that the measures that are put in place to ensure that the building caters for all users without having to make any special adjustments should be put in a way that they minimize errors and hazards. The elements chosen for use should be those that most are familiar with, those that most can easily access and thing which is a potential threat should be eliminated, shielded or even isolated. Warnings of errors or hazards should also be provided in advance and placed at strategic places to avoid causing any harm to the users of the buildings. Moreover, users should be discouraged from acting unconsciously in tasks that call for vigilance. This is due to the fact that any unconscious action can cause accidents thus doing more harm than good, which should be avoided.

The sixth principle is about low physical effort. It states that whatever measures that are put in place to ensure that all the people despite their challenges, can easily access and use the building should be ones that can be comfortably and efficiently used while causing minimum fatigue. For instance, the users who are using wheel chairs should not have to strain to get into the building. That is why the parking area is encouraged to be as near as possible to the entrance of the building. The measures put, be it in the lifts, WCs, or the offices, should permit users to use them without having to alter their body positions and instead to retain its neutral position. The operation force required should be reasonable and any repetitive action should be minimized. This means that things like door knobs should open with ease to aid the use of anyone who may be using wheel chairs or crutches. This will ensure minimum

physical effort thus avoiding strain. In addition, the lighting within the building should be adequate to avoid causing anyone with sight problems to strain.

The seventh and last principle of universal design is space and size for use and approach meaning that there should be provision of appropriate space for approaching, reaching that particular place, manipulating and using the facilities regardless of the body size of the user, their posture or ability to move. The measures put in place should be easy to see and to use by all the people whether standing or seating. They should also be made in a way that the various hands sizes and grips are considered and there should be ample space provided for any devise that the users may be having for assistance like the wheel chair, or any personal assistance that one may be having. This may include even aid dogs for the blind. These measures should be put in a way that they do not cause the particular users any discrimination.

It is clear from these seven principles that universal design was made with the intention of aiding the mobility of all the people within a building without much strain. This means that anyone regardless of their physical challenge can easily access and easily use any building, which adheres to these principles of universal design while being constructed, and the facilities within it. This in turn would make sure that every member of society, regardless of their challenges can contribute to the growth and development of that particular society to the maximum, without having to strain or use extra effort, since the buildings have been constructed in a way that they are all inclusive.

4.4 EVACUATION DURING EMERGENCY

During an emergency situation, those with disabilities are placed at greater risk if the buildings are constructed in a way that they limit the movement speed of some people. Factors that influence time taken to escape in emergency circumstances include mobility, alertness level, social affiliation, intellectual capacity, status of mental health, responsibility and role, position, commitment and focal points present in the building.

Designing for fire safety assumes that the people in a building are in a position to escape from the building independently and at the same speed. However, disabilities such as impaired mobility, poor sight, height impairment and hearing impairment affect the length of time used to evacuate from a building during an emergency. Those with hearing impairment may not understand when a sound alarm is given. To ensure that such people are assured of their safety, video-audio operators should be fitted in a position that is accessible to all (National Disability Authority 2009). During design and construction of buildings, enough space should be created for escape during emergency to accommodate those using wheel chairs and avoid queuing. While lifts are likely to put individuals using them at a risk during emergency, they remain the only means of evacuation for those with disabilities. People sometimes opt to carry persons with disability, a factor that also result in delay in the evacuation. During construction, the break glasses should be located in a position where people with disabilities can easily locate and can reach. There should also be enough number of the break glasses depending on the number of people that use the building and the number of floors. The use of automatic systems will also improve escape. Using tailoring, vibrating devices, paging system and visual alarms can be used to support those with hearing impairing (National Disability Authority 2009).

The vibrating alert systems inform a paging system that is linked to the fire alarm system is used. In case of a fire, the alarm system is activated hence triggering the paging system connected into it. A visual image is then transmitted which interprets the danger to the occupants of the building. A deaf alerter logo should be installed during construction to assist those with severe or moderate hearing impairment. Multiple transmitters should also be installed if the building is large as this ensures a wide coverage. However, to ensure effective communication, those with hearing impairment should be trained on the role of the paging system and how it operates as some may fail to interpret the message being communicated. Escape roots should be located in the normal access root to avoid confusion during escape (National Disability Authority 2009).

For those with mobility impairment, a space of safety is created. This ensures a vertical movement of individuals facing danger but is physically impaired. The space is referred to as the refugee location.

Fig.19.0: *A refugee location as shown: Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.*

This location is sized 1400x900mm and has fire resisting doors for at least 30minutes and self closing doors.

Horizontal circulation roots and handrails not only support those with impaired mobility but also act as an escape root during emergency. Enough lighting should also be allowed in the escape roots during construction. Emergency lighting should also be put in place in these buildings to provide lighting in case of power failure. Luminance in the open areas should be 1.0lux and 0.5lux for escape roots. The designers and constructors should consider the use of directional sounds when constructing a building to act as the guide to some features which include the stairs hence reducing confusion inn the occurrence of an emergency.

4.5 COST

The cost of putting up buildings will increase with the implementation of the new design. For instance, the design is to put into consideration technological changes that are aimed at promoting comfortable living and working conditions for the physically challenged. Such changes include powered wheelchair use. These wheelchairs require that buildings are constructed in such a way that the physical space is larger for the wheelchairs than were being used before the innovation. The WC facilities space should thus be considerably increased as well as the space of the turning circle and door entry. This requires the use of more materials and labor which in turn increases the total cost of the buildings.

4.6 SPACE

The construction of new buildings should aim at constructing buildings and facilities with increased space to support everyone with limited mobility. These include the people who use powered wheel chairs as this requires a spacious place.

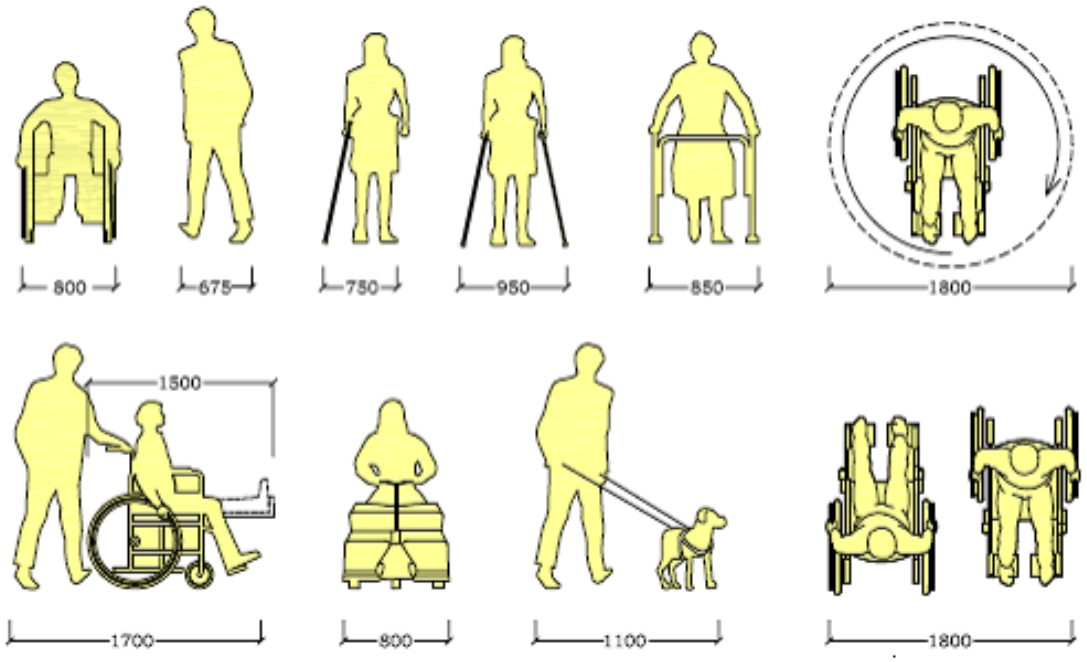


Fig.20.0 *Space requirements as shown: Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.*

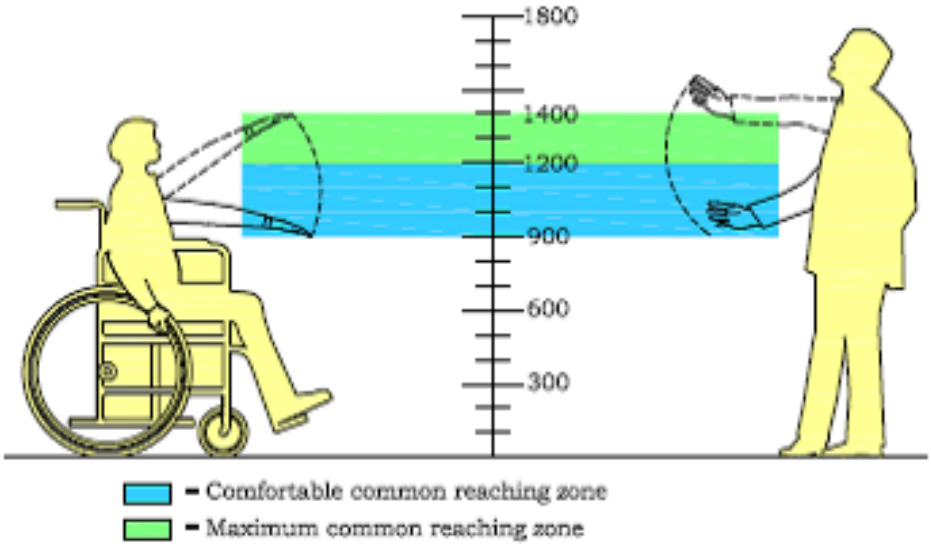


Fig. 21.0 *Space requirements as shown: Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.*

4.7 ENSURING IMPLEMENTATION

Having understood the guidelines, it is expected that all stakeholders will cooperate for the common good of all. To ensure this, continuous auditing is necessary for the new buildings and the upgrading of old buildings. The report by IWA suggested that auditing be done in collaboration with other stakeholders on the access of new buildings. This however requires well trained personnel and an in put of resources which increases the construction cost further.

4.8 PARKING

In constructing new buildings, the engineers should ensure that the parking area is constructed in such a way that it is accessible to people with mobility limitation but use vehicles. In this regard, the parking should be spacious and close to the main building to ease accessibility by people who are less mobile. The recommended maximum distance of travel is 50M (****). The construction manager comes in to determine the material to be used. The parking should be levelled and firm with maximum cross fall of 1:50.

4.8.1 THE NEW AMENDMENTS

Materials such as cobbles, sand and gravel should be avoided during construction as the limit mobility of some people and may cause tripping. Adequate lighting must also be ensured and space allowance to ensure transfer of the driver or the passenger from the car to the wheelchair. To ensure clear visibility, a white strip should be used as the coloring on a resistant blue surface.

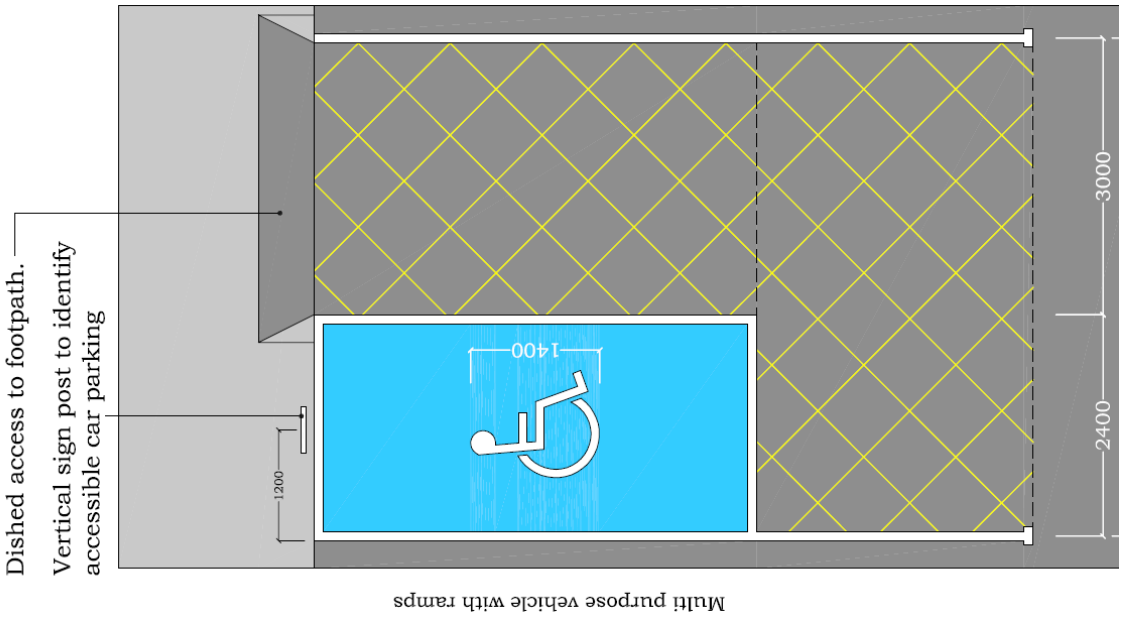


Fig.22.0: *Parking requirements as shown: Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.*

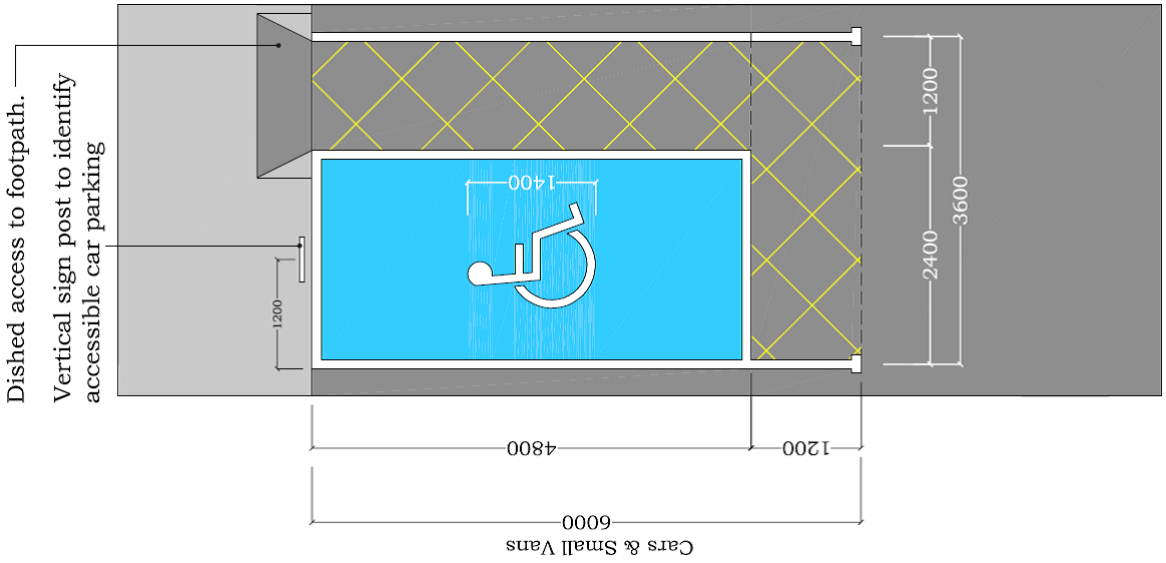


Fig.23.0 *Parking requirements as shown: Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.*

In every 6 parking being constructed, 2 of them should focus on adequate space to be used by the disabled.

5.0 CONCLUSION

Every one is important in the in the growth and development process of a country regardless of the limitations caused by impairments. Provision of a design that supports a person's daily operation will ensure social inclusion of the blind, physically challenged and those with impaired sight. Ireland is determined to ensure that her citizens are in a position to operate without straining or requiring special adaptations. The construction team forms an important part of the stakeholders if the adjustments made on part M are to be implemented successfully. Constructors have to make the decision for any detail not shown by the designer on the drawings. In addition, they must understand the drawing in order to ensure that the drawing considers accessability. In the public parking bays, one in every fifteen parking spaces should be designed to suit passengers and drivers that have physical challenges. In all parking spaces designed for those with disabilities, one out of four should be designed to accommodate vehicles that are multi-purpose and large. There are lifts set aside for evacuation of emergence and these must have separate power supply.

It is worth noting that the universal design initially targeted improving accessibility and quality of the built environment, services and products. This was with the aim of easing the mobility of people with physical challenges. Later on however, its definition was extended and recommendations made to apply its principles to include information communication technology (ICT) and services (Angela Garabagiu, 2008). This means that these principles should not only be considered while constructing buildings only, but they should also be incorporated in the information, communication and technological developments. This is important because ICT in the world is changing at a very fast rate and there it would be unfair to leave the physically challenged out. They too have a role to play in the growth and development of their country thus the need to ease their full participation.

Since the people with disabilities have talents and skills that are important, there is need to ensure that they are in a position to participate fully by putting up all inclusive buildings. This however faced some challenges such as increased construction cost which can be addressed by use of grants and full participation of

non-governmental and governmental organization. With achievement of an all inclusive design, the rate of development will be increased as the dependency level reduces.

5.1 RECOMMENDATIONS

- The planning and building control systems should work hand in hand to ensure that the details put in place during planning are included in the construction. This will ensure that all buildings comply with both the building and planning regulations. During the decision making process, designers should include constructors to help them understand the building details with ease.

- The major challenge in ensuring accessibility and safety of all people in a building is the fact that most disabled persons are not familiar with the facilities and mode of communication used especially during an emergency this indicates the directional sound and the paging system. To ensure familiarity, training is required for all stakeholders.

- There should be training on the purpose of universal design to all people to enhance maintenance of the facilities put in place hence reducing the maintenance cost.

- The government and non-governmental organization should be involved in sponsoring the constructors to come up with all inclusive buildings and surrounding environment.

APPENDIX A
QUESTIONNAIRE/SURVEY

Design professionals' views within the construction industry implementing universal design into construction projects in Ireland

To: abevitali@hotmail.com

From: sinrey2000@hotmail.com

Subject: Professional Designers Opinions on Universal Design

Body:

Dear Sir/Madam,

I am currently a final year student studying BSc in Construction Management in DIT Bolton Street. As part of my final year I must submit a Thesis. My Thesis title is "Implementing Universal Design in Ireland".

I would really appreciate if you would complete a short survey on the above topic. Please click on the following link. http://www.surveymonkey.com/s.aspx

I look forward to receiving your reply at your earliest convenience. Let me take this opportunity to thank you in advance for the time and effort required to respond to these questions.

Finally; let me ensure you that all the information received will be treated as confidential and will be used solely for the purpose of my Thesis.

If you do not with to complete the survey please click on the following link.
http://www.surveymonkey.com/optout.aspx

If you have any queries, please do not hesitate to contact me at
sinrey2000@hotmail.com.

Kind Regards

Sinéad Reynolds

Professional Designers opinions on Universal Design

1. Gender & Profession

33%

1. What is your gender?

- Male
- Female

2. Which area of construction do you presently work?

- Architecture
- Engineering
- Quantity Surveying
- Other (please specify)

Next

2. Technical Guidance Document Part M

67%

1. Are you familiar with Technical Guidance Document Part M - "Access for people with Disabilities", and that they are presently being reviewed by the government to be released in July 2010?

- Yes
- No

2. Do you use any other references or standards in accordance with TGD Part M?

- No
- Yes (please specify)

3. Do you feel that Technical Guidance Document Part M meets the requirements for majority of people with disabilities?

- Yes
- No (please explain)

4. Which impairments do you believe are catered for in Technical Guidance Document Part M?

- Mobility
- Visual
- Hearing
- Cognitive
- All
- None

Comments

Prev Next

3. Accessibility & Local Authority

100%

1. How often does accessibility form part of your Project Brief?

- Frequently
- Sometimes
- Never

Comments

2. In your experience, where do you believe the most problems occur with regard to accessibility within the built environment?

- Access
- Circulation
- Sanitary
- Other (please specify)

3. How often is the issue of accessibility raised during pre-planning meetings with the Local Authority?

- Frequently
- Sometimes
- Never

Comments

4. In your own experience; are the standards stated in Technical Guidance Document Part M being enforced by Local Authorities?

- Yes
- No (please explain)

Prev Done

Professional Designers opinions on Universal Design

1. What is your gender?

	Response Percent	Response Count
Male	80.0%	24
Female	20.0%	6
answered question		30
skipped question		0

2. Which area of construction do you presently work?

	Response Percent	Response Count
Architecture	20.0%	6
Engineering	36.7%	11
Quantity Surveying	16.7%	5
Other (please specify)	26.7%	8
answered question		30
skipped question		0

3. Are you familiar with Technical Guidance Document Part M - "Access for people with Disabilities", and that they are presently being reviewed by the government to be released in July 2010?

	Response Percent	Response Count
Yes	80.0%	24
No	20.0%	6
answered question		30
skipped question		0

4. Do you use any other references or standards in accordance with TGD Part M?

	Response Percent	Response Count
No	70.0%	21
Yes (please specify)	30.0%	9
answered question		30
skipped question		0

5. Do you feel that Technical Guidance Document Part M meets the requirements for majority of people with disabilities?

	Response Percent	Response Count
Yes	40.0%	12
Don't Know	43.3%	13
No (please explain)	16.7%	5
answered question		30
skipped question		0

6. Which impairments do you believe are catered for in Technical Guidance Document Part M?

	Response Percent	Response Count
Mobility	73.3%	22
Visual	36.7%	11
Hearing	23.3%	7
Cognitive	3.3%	1
All	25.7%	8
None	0.0%	0
Comments		0
answered question		30
skipped question		0

7. How often does accessibility form part of your Project Brief?

	Response Percent	Response Count
Frequently	43.3%	13
Sometimes	40.0%	12
Never	13.3%	4
Not Relevant	3.3%	1
Comments		2
answered question		30
skipped question		0

8. In your experience, where do you believe the most problems occur with regard to accessibility within the built environment?

	Response Percent	Response Count
Access	60.0%	18
Circulation	56.7%	17
Sanitary	20.0%	6
Other (please specify)	6.7%	2
answered question		30
skipped question		0

9. How often is the issue of accessibility raised during pre-planning meetings with the Local Authority?

	Response Percent	Response Count
Frequently	26.7%	8
Sometimes	53.3%	16
Never	10.0%	3
Not Relevant	10.0%	3
Comments		1
answered question		30
skipped question		0

10. In your own experience; are the standards stated in Technical Guidance Document Part M being enforced by Local Authorities?

	Response Percent	Response Count
Yes	63.3%	19
No (please explain)	36.7%	11
answered question		30
skipped question		0

APPENDIX B

24 HOUR UNIVERSAL DESIGN CHALLENGE PRESENTATION

TRINITY•HAUS
helen hamlyn centre

24 Hour Universal Design Challenge
6th-7th of November 2009

NDA
National Disability Authority
Údarás Náisiúnta Míchumais

Centre for Excellence in Universal Design

Sinéad Reynolds

Student in DIT
Bolton Street

- Full-Time Student, BSc. Construction Management.
- Previous Part-Time Student BTech. Construction Technology.
- Took Part in the Challenge as part of research for Thesis

Sinéad Reynolds

What is the 24 Hour Universal Design Challenge?

- The 24 Hour Universal Design Challenge was organized by TrinityHaus, the Centre for Excellence in Universal Design and the NDA.
- Main organisers; Dr A Fennell (TCD), J Hubbard, N Murphy (NDA/CEUD) and Professor Ruth Marrow (Queens University).
- There were five teams with a variety of design disciplines.
- Each team were given a map, ours was showing Abbey Street between Liffey street and Capel Street.
- We first walked, photographed, observed and got inspiration on how un accessible to everyone it is.

Sinéad Reynolds

The Brief

- Each team was assigned a different route through the city.
- Teams had a design sponsor each - a member of the public with a disability, to identify obstacles and problems.
- Teams had their own conference room for the 24 hours to come up with an idea, design it and present to a team of judges and the public
- Teams worked throughout the night to come up with a solution based on their experiences to fulfill the principles of universal design.

Sinéad Reynolds

This is our Team Design Sponsor, Genny.

Genny is a self described Venetian Blind

Sinéad Reynolds

We walked Abbey Street with Genny along the Luas Line.

Sinéad Reynolds

Obstacles were everywhere!

Even common objects were serious hazards

Sinéad Reynolds

Well intentioned interfaces failed

Sinéad Reynolds

Genny showed us how to walk with a blind cane.

Sinéad Reynolds

For Genny, one side of the street was clearly easier to navigate

Sinéad Reynolds

Coming up with Idea

Sinéad Reynolds

Putting together Video & Presentation

Sinéad Reynolds

MY WAY finds the path most travelled

Sinéad Reynolds

MY WAY

Sinéad Reynolds

MY WAY is also a Social Network where members can log their routes and share with other members.

Sinéad Reynolds

Who could use such a service?

MY WAY supports everyone.

- Blindness/Poor Visibility
- Buggy users/Young Children
- Cyclists
- Deaf/Hard of Hearing
- Elderly
- Tourism
- Wheelchair users
- Also just for fun for users to log distances and routes they walked

Sinéad Reynolds

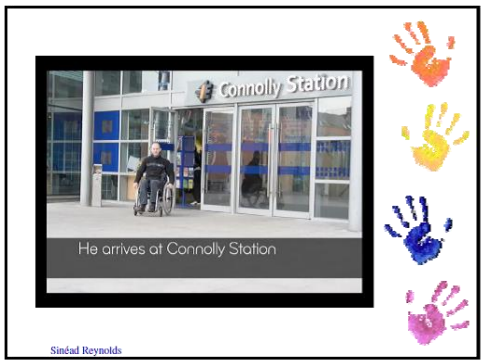
MY WAY Video

Sinéad Reynolds

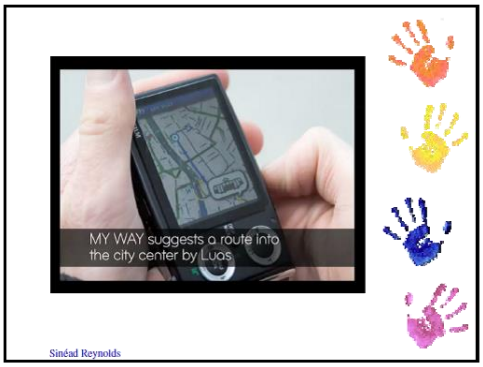
Tony's an engineer from Sligo…and he's also in a wheelchair

Today he's going to Dublin for a conference; he's unfamiliar with the city

Sinéad Reynolds


Connolly Station
He arrives at Connolly Station
Sinéad Reynolds

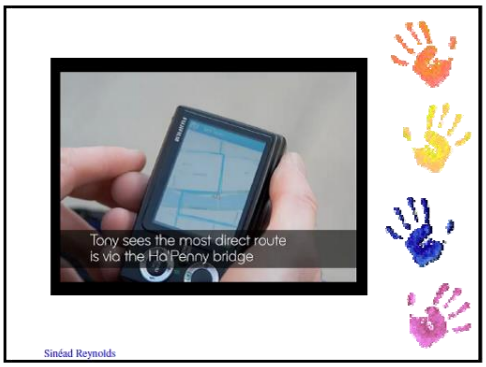
He signs in to the MY WAY service
Sinéad Reynolds


MY WAY suggests a route into the city center by Luas
Sinéad Reynolds

He can choose various methods to get directions
Sinéad Reynolds

He takes the Luas to Abbey St.
Sinéad Reynolds

On arrival, Tony rates the luas as a good choice
Sinéad Reynolds


Tony sees the most direct route is via the Ha'Penny bridge
Sinéad Reynolds

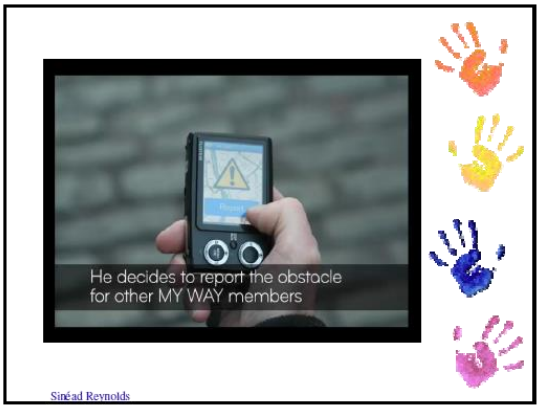
He is confused as MY WAY suggests the Millennium Bridge
Sinéad Reynolds

He's decides to go his own way
Sinéad Reynolds

Sinéad Reynolds

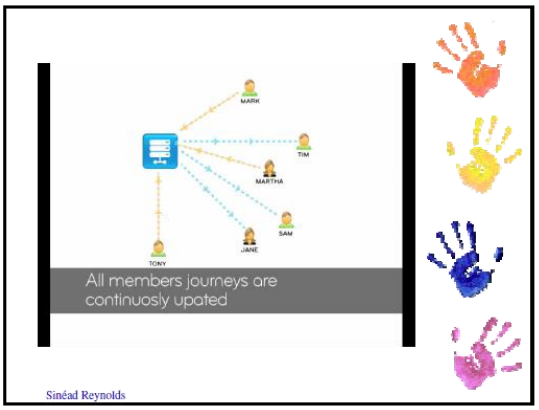
Now he takes MY WAY's suggestion
It's much more accessible
Sinéad Reynolds

In Temple Bar, he struggles
on the cobble stones
Sinéad Reynolds


He decides to report the obstacle
for other MY WAY members
Sinéad Reynolds

With help from MY WAY
Tony reaches his destination
Sinéad Reynolds

Tony is finished his journey, his path
is shared with others on the system
Sinéad Reynolds


All members journeys are
continuosly upated
Sinéad Reynolds

Thank You
Team A (MY WAY Team)
Sinéad Reynolds

I Learnt…
Universal Design effects everyone, not just those with a disability.
Putting myself into the shoes of someone with a disability, helped me to understand the avoidable difficulties of getting around through little effort of thought in design.
Dublin City's not as accessible to everyone as I thought unless an individual's familiar with the area due to many unnecessary obstacles.
It takes little thought and effort to incorporate and consider Universal Design into building.
Sinéad Reynolds

APPENDIX C

TABLES

Iindicates space requirement for people with mobile impairment and who use different facilities to aid their movement from one place to another including turning @ Guidance Irish Wheel chair association, May 2009, Best practice access Guidelines, designing accessible environments.

Checklist

This Checklist can be used as a guide to find out if a building is accessible to people wit physical and/or sensory disabilities.

The measurements listed below show the DESIRABLE measurement required to meet the needs of people with disabilities. The MINIMUM measurements are the legal requirements referred to in the TGD Part M. These MINIMUM measurements do not meet all the needs o people with disabilities.

FOOTPATHS	**Desirable**	**Minimum**
• Width	1800mm	
• Dishing/dipping gradient	1 : 20	1 : 12
• Dishing/dipping width (level surface)	1400mm	1000mm
• Kerb edge – maximum height marked with a strong colour contrast		

DOORS	**Desirable**	**Minimum**
• Main Entrance	900mm	800mm
• Internal doors	900mm	750mm
• Lift door	900mm	800mm
• Glass doors must be visually identified		
• Handles must be easily operated by people with disabilities		

SLOPES/RAMPS	**Desirable**	**Minimum**
• Width	1200mm	1000mm
• Gradient	1 : 20	1 : 12
• Turning width at either end	1700mm	1500mm
• All surfaces must be non-slip		

STAIRS & STEPS	**Desirable & Minimum**
• Tread	280mm
• Risers	150mm
• Two sets of handrails must be:	
➢ Fitted for all ramps/steps/stairs	840 mm (height)
➢ Beyond first and last step by	300mm

All steps must have uniform depth and height. The first and last step should provide a permanent visual contrast with the rest of the steps

TOILETS : PUBLIC BUILDINGS

Toilet size should be adequate to accommodate the wheelchair user and assistant. Unisex accessible toilets should be independent of other sanitary accommodation.

		Desirable & Minimum
• Toilet		450mm (height)
• Wash hand basin		800mm (height)
• Knee clearance of		700mm (height)
• Three grab rails should be positioned by WC		
➢ Horizontal		700mm (height)
➢ Vertical		800mm (height)
➢ Folding horizontal		450mm (height)
• Mirror		900mm (height)
• Hand towel dispenser		1100mm (height)
• Dimension of cubicle	**Desirable**	2700mm x 2000mm
	Minimum	2000mm x 1500mm

It is recommended that doors open outwards if the toilet is not larger **than 2000mm x 1500mm** to accommodate powered wheelchairs.

TOILETS : HOUSING

Dimension of cubicles where storey area is more than $45m^2$

Desirable 2000mm x 1500mm **Minimum** 1500mm x 1400mm

Dimension of cubicles where storey area less than $45m^2$

Desirable 2000mm x 1500mm **Minimum** 1500mm x 850mm

SHOWERS

- If washing facilities are provided, please note that level deck showers are preferable to baths.
- Dimension of cubicles 2700mm x 200mm (**Desirable** and **Minimum**)

CORRIDORS / PASSAGEWAYS

	Desirable	**Minimum**
• Width for public access	1800mm	
• Without public access	1800mm	1200mm
• Turning space	1800mm	1500mm

LIFTS

- A lift must be provided where the net area of a two storey building is 280 m^2 per floor
- Controls: Must be situated between 900mm and 1200mm from floor and should incorporate tactile indicators
- Lifts should be fitted with half length mirror at back wall.
- Lift Dimensions: **Desirable** $2000mm^2$ x $2000m^2$
  Minimum $100mm^2$ x $1400mm^2$

ENTRANCE and LOBBY

- Dimension 2000mm^2 x 2000mm^2 (**desirable**) or 1500mm^2 x 2000mm^2
- Signage should be clear, concise and raised where appropriate
- All public buildings should have loop systems installed, to accommodate people with hearing impairments.

COUNTER HEIGHTS

	Desirable
• Height of lower section	750mm – 850mm

- Split level counters are desired for universal access
- Note that screens may restrict communication

APPROACH TO BUILDING

- The main entrance should be accessible to people with physical disabilities.

PARKING

- One disabled parking bay for every twenty five parking spaces.
- Size of perpendicular parking space 4800mm x 2400mm
- If there is more than one disabled parking bay, add 900mm between bays for optimum access.

EMERGENCY PROCEDURES

- All escape routes should be usable by people with disabilities
- Emergency alarm system should be linked with general lighting for visual alert.

6.0 REFERENCES

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