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Emergence and Development of Architectural Accessibility and Universal Design in the World and Brazil

Lucas de Souza Ramalhaes Feitosa
Master's degree in Architecture and Urbanism at Mackenzie Presbyterian University – UPM.
Holder in the office Lucas Feitosa Architect.
São Paulo – Brazil
lucas.feitosa@gmail.com

Dr. Roberto Righi
Architecture and Urbanism Full Professor at Mackenzie Presbyterian University
São Paulo - Brazil
roberto.righi@mackenzie.br

***Abstract*-This article aims to show the emergence and development of accessibility concepts, universal design, accessibility in Brazil, and involving the concern spaces accessible and universal to meet people, having or not some kind of disability and issues for social inclusion. There was an increase in demand for accessibility resulting from an absolute and relative increase in the number of people with disabilities in Brazil and the world, which is covered in this work**

Keywords; accessibility; person with disabilities; universal design; social inclusion; ergonomics.

I. INTRODUCTION

The accessibility became relevant after the Second World War and more recently, in the Korean War, Vietnam and the Middle East, resulting in progressive change in attitude of governments and the United Nations - UN, which raised awareness and take consciousness of need for integration of the military with sequels, and civilians who returned maimed conflicts. This social inclusion of attitude experienced international and national recognition [1]. In 1970, the United Nations promoted the "Design Barrier Free" [2] and the first accessibility guidelines became widespread in Europe, USA and Japan. During this period, accessibility, took into consideration the buildings, roads and conditions of education and work [3]. In Brazil, accessibility began in 1981, when was declared the International Year of Disabled Persons by the UN [1]. In this context, it emerged the first technical standard NBR 9050: 1985 of the Brazilian Association of Technical Standards - ABNT.

The Federal Constitution of 1988 established the legal framework for accessibility in article 227 "§ 2 - The law shall regulate construction standards for public sites and buildings of public use and manufacture of public transport vehicles in order to ensure adequate access to people with disabilities"[4]. Before to the 1988 Constitution, this issue had only been addressed in the Constitutional Amendment 12 of October 17, 1978, which "ensures the Disabled to improve their social and economic condition," treating respect only of access to buildings and public places [5].

II. METHODOLOGY

The research methodology used for the survey on accessibility and universal design is done through research techniques, legislative and regulatory references. Among the most relevant: Federal Law 7,405/1985, the Constitution of 1988, Federal Law 7,853/1989, Federal Law 10,048/2000, Federal Law 10,098/2000, Federal Decree 3,298/1999, Federal Decree 5,296/2004, Federal Decree 6,949/2009 and NBR 9050:2015 ABTN, that focuses on the source of the accessibility and the emergence of universal design in Brazil.

III. THEORETICAL FRAMEWORK

A. Accessibility History

A significant portion of the world population, live with a disability, whether mental, physical, visual or hearing, and it drew public attention to the problem of social inclusion [6]. To ensure human rights, the existing architectural barriers began to be incompatible with the right to citizenship of people with disabilities [7]. With the identification of architectural barriers, there were questions of how to remove them and the word "accessibility" has come to be used as a concept of removal and absence of such barriers as people with disabilities in need of spaces and environments that can exercise their activities freely and without obstacles.

The application of accessibility concepts in architecture and urbanism are assigned to the Scandinavian countries in the 1950s [8]. At this time in Denmark, the concept arose of standardization [9]. These commonalities are "measures that allow anyone to live comfortably, regardless of age, sex, disability, perception and ability to move" [3].

In 1960, came accessibility specifications to buildings for people with disabilities, in England, in the United States in 1968 and Sweden in 1969, showing the sequence of adhesions to this initiative [10].

In 1968, he conducted a contest for the organization "Rehabilitation International", an advisory body of the United Nations - UN for accessibility issues [11]. The chosen accessibility symbol was the Danish Sussane Koefoed. She introduced the name logo with the person with wheelchair (Fig. 1) [7].

Figure 1 - International Symbol of Access - ISA
Source:http://incluase.blogspot.com.br/2008/10/simbolo-internacional-de-acesso-sai.html, access on April 11, 2016.

The logo was also chosen to represent the International Symbol of Access - ISA, the UN. The ISA is widely used to identify buildings, facilities, public parks and other places that do not have barriers and architectural barriers, allowing the right to come and go of people with disabilities.

The UN in 1970 promoted the concept of "Design Barrier Free" and the International Organization published the first accessibility guidelines for persons with disabilities for Standardization - ISO. So the technical standards have become accessible to the public, approved by standardization bodies, by consensus of stakeholders, based on results of science, technology and experience to obtain benefits the community [12].

With the adoption of the Declaration on the Rights of Persons with Mental Disabilities by the UN in 1971, it was determined "the need to protect the rights of physically and mentally disabled, and to ensure their welfare and rehabilitation". He became a pioneer in the rights of people with physical and mental disabilities in the pursuit of social inclusion [6].

In 1973, the United States, the "Rehabilitation Act" was established, which provided reasonable accommodation and environments with less restriction in higher education and jobs. Adaptations were funded by the federal government, through the provision of equipment "Rehabilitation Technologies in Rehabilitation Individual Programs" according to [3]. After two years, these measures were extended to schools promoting the integration of children and young people with disabilities through the "Education for All Handicapped Children Act".

In 1975, the UN adopted Resolution 3447, which was on the Declaration of the Rights of Disabled Persons [6]. The document appears for the first time the concept of disabled person as:

> "Any person unable to ensure by itself, wholly or partly, the necessities of a normal individual or social life, as a result of a deficiency, congenital or not, in their physical and mental abilities."

The landmark of accessibility in the United States, occurred in 1980 with the creation of "Americans with Disabilities Act" - ADA through the "Civil Law which prohibits discrimination of people with disabilities and promotes accessibility at work, in buildings and public transport, in places open to the public and telecommunications" and it was sanctioned in 1990 [3].

So the history of accessibility shows concern for the inclusion of people with disabilities in society through the elimination of architectural barriers and changing attitudes, such as the prohibition of discrimination against persons with disabilities in the United States through the ADA and start to seek "Universal Design" or "Design for All". The latter term is used in Europe and to meet the largest possible number of people without the need for adaptation, through the concept of accessibility.

In the United States in 1982, was published a guide to minimum standards for accessible design [13]. The first European standard of accessibility published only in November 1990, but the beginning of its development occurred in May 1985 [14].

The UN in 1993 published "Standards for Individual Opportunities Equalization with Disabilities" establishing for accessibility, through the number five rule that:

> "States should recognize the fundamental importance of accessibility in the process of realization of equal opportunities in all spheres of society. For people with disabilities of any kind, States should: (a) establish action programs to make accessible the physical environment, and (b) take measures to ensure access to information and communication." [15]

Standard UN recommends to states to be provided accessibility conditions in various social areas, which are buildings, housing, public transport and other transportation facilities, roads and public outdoor spaces [3].

B. Universal Design

The way to develop architectural projects, urban and products with universal design had its origin in the United States, as result of legal, economic, demographic and social changes, involving people with disabilities and the elderly.

It is important to note that in the nineteenth century life expectancy was low and the North American society had a small number of people with disabilities, but with advances in medicine in the twentieth century, there was been changing with increasing life expectancy [16].

The increase in the elderly and people with disabilities reflected directly in the laws of the United States from the 1970s to 1990. In this period emerged discrimination laws, as discussed in the previous section, trying to ensure basic rights such as education, employment, transport public and social inclusion.

The Physical barriers have been identified and this led to a federal law to point minimum accessibility requirements. Architects to realize they were conducting improvements in the environment for

people with disabilities, also helped with other users and found that they could be more saleable, safe and attractive [16].

Ronald L. Mace (Ron Mace), which influenced the change of paradigm of architectural projects and design used the “Universal Design”. "Universal design is responsible for creating environments and products that can be used by as many people as possible" [12]. The way to think of projects for the largest possible number of users has led researchers at the North Carolina State University to deepen their investigations. Mace was part of this group of researchers, together with Bettye Rose Connell, Mike Jones, Jum Mueller, Abir Mullick, Elaine Ostroff, Jon Sanford, Ed Steinfels, Molly Sotry and Gregg Vanderheidenentre [16].

These researchers have proposed seven principles and guidelines for Universal Design, considered as reference for all architectural projects for evaluation of existing projects, guidance for design projects, educational literature, training of architects, designers, other professionals associated with the construction, serving to guide consumers evaluate products and buildings [12].

The synthesis of these concepts, expressed through seven principles essences are systematized and presented in Table 1.

Principles	Guidelines
1. Assimilation in use possibilities	a. Provide the same use of resources for all users
	b. Avoid segregating or stigmatizing any users
	c. Provide privacy, also safety and security for all users
	d. Make attractive product to all users
2. Flexibility of use	a. Provide choice of using methods
	b. Accommodate access and use by right and left handed
	c. Facilitate accuracy and precision user
	d. Provide adaptability to the user rhythm
3. Simple and intuitive use	a. Eliminate the complexity that is unnecessary
	b. Be consistent with the expectations and user intuition
	c. Adjust to a wide range of skill levels and language ability
	d. Organize information according to its importance
	e. Provide guidance and effective feedback during and after task completion
4. Perceptible information	a. Using different media of communication- symbols, sound information, tactile, etc
	b. Provide adequate contrast
	c. Maximizing the clarity of essential information
	d. Makes it easy instructions and resources to be used by people with sensory limitations
5. Tolerance to error	a. Arrange elements to minimize hazards and errors
	b. Provide hazard warnings and errors
	c. Provide secure resources to failures
	d. Discourage unconscious action in tasks that require attention
6. Minimum physical effort	a. Allow user to maintain a neutral body position
	b. Use reasonable operating forces
	c. Minimize repetitive actions
	d. Minimize sustained physical effort
7. Dimensioning spaces for access and use of all users	a. Provide a clear line of sight to important elements for any seated or standing user
	b. Become comfortable access to all components for any user sitting or standing
	c. Accommodate variations in hand size and grip
	d. Provide adequate space for the use of assistive devices or personal assistance

Table 1 - Universal Design Principles
Source: made by the author as from [12] and [16].

Commenting and understanding better these principles, it can be said that Principle 1, which deals with the Equalization of Use Possibilities, researchers at the University of North Carolina, highlighted that universal design is not for a specific group of people. It aims to cater to all groups through equal use and guidelines require that people with different abilities can use the objects, products and spaces [16].

For Principle 2, which refers to the use flexibility, it is stated "accommodate a wide variety of preferences and individual abilities" and guidelines, to meet people with different skills, different preferences and adaptable to any use [16].

In Principle 3 is specified on the Use Simple and intuitive, which makes using "easy to understand, regardless of experience, knowledge, language skills or user attention span" [16].

Principle 4 deals with Noticeable information, and has the objective to "effectively communicate to the user the necessary information regardless of environmental conditions or sensory ability of this" [12].

Principle 5 refers to tolerance error, with the objective "to minimize the risks and adverse consequences of accidental or unintended actions" [16].

Principle 6 deals with the Physical Exertion Minimum, establishing the universal design to use comfortably and efficiently, with minimal or low physical effort and fatigue [12].

Principle 7 refers to spaces sizing for Access and Use of All Users, stating that the "appropriate size and space for approach, reach, manipulation, and use regardless of user's body size, posture or mobility" [16].

It is considered therefore that the architectural designs made according to the seven principles of Universal Design brings benefits to all users, making the safer areas, attractive and saleable as finding of researchers who defined them. This way for universal design promotes quality of life for all citizens, in buildings, cities, instruments and industrial products:

> "...there must be a change of attitude of all stakeholders involved to know: users, consumers, businesses, engineers, architects, designers and government institutions." [12]

With this change, each agent must evaluate the importance and application of universal design for all win with the buildings, cities, products and especially users with respect to universality. The definition of universal design by NBR 9050:2015 ABNT says:

> "Design of products, environments, programs and services to be usable by all people, without the need for adaptation or specialized design, including assistive technology resources."[17]

This definition makes it clear that the project must meet anyone, and she some kind of disability or not. The goal is creating accessible environments for all, being of short stature, wheelchair, visually impaired, children, people with temporary or permanent mobility, among others is enhanced:

> (...) Universal Design encompasses situations and distinct patterns - as men and women high and low, standing or sitting, of different ages and physical, sensory and cognitive skills - considering its limits. (...) [18]

The Universal design is no longer just a simple support tool for more democratic project, and becomes a broad field of study. At the beginning of the century, reached in Brazil a great academic progress, but:

> (...) there is need for much wider progress to put ourselves on a par with countries that have already debated the issue for more than three decades. [18]

The professionals involved and the materials necessary for universal design is applied in project development and construction depend on the academic and the industrial sector.

For professionals in the construction area, such as architects and engineers, it is very widespread practice of universal design and accessible building.

> "It seems to us that the best strategy to unite ergonomics and architecture occurs during project exercise. This is the time to incorporate the principles of ergonomics to design physical environments." [19]

Is a clear need to think about the ergonomics and accessibility at the time of project design without the need for further adjustments?

The industrial sector, even with technological advances, offer few sources, and offers more expensive work [20].

Another factor is the lack of disclosure of accessible products, universal design and it is stated that:

> “The marketing is not present in the exhibition of products for universal design and accessibility - static appeal that turn into 'object of desire', allowing its inclusion in the windows is still little explored in the same way that the solutions are not exposed in the media.” [21]

Therefore, the use of the term universal design in the development of architectural projects, it takes account of the creation of environments free of physical barriers, easy movement and allowing the use by many people. Watching the exposed factors, imagine the positive impact of social gain, through inclusive practices as universal design, will open new ways for change and acceptance of professionals who are not yet involved and for the industry.

C. Accessible in the Brazil

Accessibility issues in Brazil became more visible in the 1980s, as some laws have been enacted with intuited to ensure access and use of the built environment, following the international movement. The fundamental law, which serves people with disabilities in Brazil, they are the Federal Law 7,405/1985 and the Federal Law 7,853/1989 was regulated by Federal Decree 3,298/1999 [22].

Federal Law 7,405/1985 requires the placement of the International Symbol of Access - ISA, in places where people with disabilities have access and gives other providences [23].

In 1988, in response to movements organized by people with disabilities, established in the Federal Constitution:

> Article 5. All persons are equal before the law, without distinction of any kind, guaranteeing to Brazilians and foreigners residing in the country the inviolable right to life, liberty, equality, security and property (...)
>
> Article 244. The law provides for the adaptation of public parks, of public buildings and public transport vehicles currently exist to ensure adequate access to disabled persons, pursuant to art. 227, § 2. [4]

The document ensures accessibility in buildings, transport and that all are equal before the law [7].

Federal Law 7,853/1989 shifts responsibility to states and municipalities for the adoption of measures to eliminate barriers to access in buildings, urban spaces and transport for people with disabilities and the Federal Decree 3,298 / 1999, which regulated the law provides for the national policy for the integration of people with disabilities [25].

The Prosecution Service acquired new role and reference to the Federal Constitution of 1988 as the Federal Law 7,853/1989 allowed legitimate defence of the rights of persons with disabilities, establishing rules for civil action and civil investigation [22].

It was based on these laws, decrees and constitution that justice has won the case for some major lawsuits for people with disabilities [7]. One of these actions took place against the São Paulo Metro in the 1980s, not to answer questions regarding accessibility. The company had a tough approach to the subject and then the lawsuits started to work in favour of technical standardization. The Secretary of State of São Paulo joined the Metro and started to collaborate with the Brazilian Association of Technical Standards (ABNT) and the result was the revision of NBR 9050:1985 ABNT in 1994.

NBR 9050:1994 ABNT had as significant reference "an accessibility manual without Ohio of the US state barriers"[7]. In the same year, Edward Steinfield attended a congress in Rio de Janeiro accessibility and when was included the "universality" in the standard.

All this has led to important changes that have gone to the architectural projects in general, not just for a specific audience, but also for people with disabilities.

Accessibility next to buildings and urban spaces in Brazil became mandatory after the Federal Decree 5,296/2004 regulated the Federal Law 10,048/2000, which "gives priority service to people who specify (...) [26]" and the Federal Law 10,098/2000 "establishes general rules and basic criteria to promote accessibility for people with disabilities or reduced mobility and other measures [27]". They determine accessibility criteria for people with disabilities, physical, visual, mental, multiple, hearing, handicapped, elderly, obese, pregnant women, nursing mothers and people accompanied with infant in arms.

The Federal Decree 5,296/2004 determined deadlines for the implementation of accessibility in buildings of public entities [28], and until June 2, 2007, to the existing collective use buildings until December 2, 2008 and the other uses determined in the decree the deadline for implementation should be immediate, as shown in table 2.

Main approaches of the decree	Where to apply	Immediate application	Deadline for drafting the standard	Deadline for implementation	The effective date
Priority to people with disabilities or reduced mobility	Public agencies, indirect and basic administration; companies providing public service; Financial Institution; Public and private establishments of health care.	Yes	Immediate (ABNT NBR 9050:2004)	Immediate	**12/02/2004**
Architectural and urban accessibility	Design and implementation of architectural and urban projects; roads; public places; public spaces; squares; parks; around and inside the buildings of public use and collective; environment and internal common areas in buildings of multifamily private use; adaptation of immovable cultural property; furniture and urban equipment.	Yes	Already existing (ABNT NBR 9050:2004)	Immediate	**12/02/2004**
In public use buildings existing	Buildings managed by entities of the public, direct and indirect administration, or by providing public services and for the general public companies; meeting places, sports, shows, conferences, public education institutions.	No 30 months after publication	Already existing (ABNT NBR 9050:2004)	**06/02/2007**	**12/02/2004**
The collective use of existing buildings	Theaters, cinemas, auditoriums, stadiums, gymnasiums, concert hall, conference rooms; private educational institutions.	No 48 months after publication	Already existing (ABNT NBR 9050:2004)	**12/02/2008**	**12/02/2004**
In urban furniture	In public spaces and buildings.	Yes	Already existing (ABNT NBR 9050:2004)	Immediate	**12/02/2004**
Accessibility in social housing	Building multifamily use and social housing.	Yes	Already existing (ABNT NBR 9050:2004)	Immediate	**12/02/2004**
Accessibility to cultural property	Public property, spaces for culture.	Yes	11/25/2003 Normative Instruction number 1 of IPHAN (NBR 9050)	Immediate	**12/02/2004**

Table 2 - Brazil Affordable - Decree of Implementation Number 5,296/04 - Notebook 3, 2006.
Source: http://www.cidades.gov.br/images/stories/ArquivosSEMOB/Biblioteca/BrasilAcessivelCaderno03.pdf, access on April 4, 2016.

Another important factor for improving the accessibility of regulation is the NBR 9050:2004 ABNT, which now has the effect of law through the Federal Decree 5,296/2004.

Over the past 30 years, as shown in Table 3 to NBR 9050 ABNT, it was revised three times in 1994, 2004 and 2015, as shown in table 3.

Year	Title	Publication Date	Valid From
1985	NBR 9050 - Adequacy of buildings and street furniture to the disabled person - Procedure	09/01/1985	-
1994	NBR 9050 - Accessibility for people with disabilities to buildings, space, urban furniture and equipment – Procedure	09/30/1994	10/31/1994
2004	NBR 9050 - Accessibility to buildings, furniture, equipment and urban spaces	05/31/2004	06/30/2004
2015	NBR 9050 - Accessibility to buildings, furniture, equipment and urban spaces	09/11/2015	10/11/2015

Table 3 – All NBRs 9050 of ABNT
Source: made by author as from ABNT

The creation of NBR 9050:1985 ABNT, she had intended to fix "(...) the conditions required, as well as standards and measures to provide disabled people better and more appropriate conditions of access to public buildings and urban thoroughfares. [29]" In the first revision of NBR 9050:1994 ABNT aimed to establish "(...) the standards and criteria that aim to provide people with disabilities safe and adequate conditions of autonomous accessibility to buildings, space and furniture urban facilities [30]". In the second revision of NBR 9050:2004 ABNT has the objective of establishing "(...) technical criteria and parameters to be observed when the design, construction, installation and adaptation of buildings, furniture, urban spaces and equipment to conditions accessibility [31]". Finally, the third revision to NBR 9050: 2015 ABNT has the objective of establishing "(...) technical criteria and parameters to be observed for the design, construction, installation and adjustment of urban and rural areas, and building conditions accessibility [17]".

As balance can be considered that the success of the NBR 9050 ABNT occurred was the "technical quality, user interest and the general society and support of economic groups or the public power" and have effect law [7].

It is also relevant to note that Brazil ratified in 2008 the International Convention on the Rights of Persons with Disabilities 2007, adopted by the UN and its Optional Protocol, through the Federal Decree 6,949/2009 for the improvement of quality of life, education, work , health, people with some kind of disability, even temporary and:

> "The document obtained so constitutional amendment equivalence, valuing the joint operation between civil society and government in a democratic and effort as possible." [32]

The Convention provides for constant monitoring in daily preservation of human rights and Brazil show the current situation and "courageously recognize that, although much has been done, there is still much to do.[32]"

The International Classification of Functioning - ICF established by the UN Convention, the amendment of the medical model to social was another breakthrough, won where it states that "(...) the limiting factor is the environment in which the person is inserted and not the disability you (...)".

The approach shows that deficiencies do not indicate the presence of disease or that the person should be considered ill. The no access to goods and services should be addressed collectively through structural policies, providing for the equalization of opportunities.

> "Brazil has one of the most advanced legislations that address accessibility broadly, involving various sectors." [12]

So, even having standards, laws and adoption of the International Convention on the Rights of Persons with Disabilities, the effective implementation is required, with the oversight of public power and society, because it is no use having one of the most advanced legislation but put them in practice.

D. People with Disabilities in Brazil and World

In 2011, the World Health Organization (OMS) announced that more than 1 billion people in the world have some kind of disability. Other information disclosed in the report, was that few countries have implemented in recent years, effective mechanisms in favour of the disabled person [33].

In Brazil, according to the Census 2010 the Brazilian Institute of Geography and Statistics - IBGE, the number of people with disabilities has increased a lot, compared to the 2000 Census. The percentage of people who claim to have some type of disability in Census 2010 is 23.9% [34] against 14.5% [35] realized in 2000, recording strong increase of people who consider themselves with some kind of disability. This considerable increase in the number of people

with disabilities, held in part by the change in research methodology. The Brazil in 2005 became part of the Washington Group on Disability Statistics – GW, which aims to standardize the collection of statistics of persons with disabilities, in both population censuses and other surveys home, following international standards of statistics for harmonized information among the member countries of the group [36]. This homogeneity in the determination of this index disrupted the sequence of national data, however showed a serious situation because the rate of people with disabilities to the United States in 2010 is 19% (United's States Census Bureau [37]), despite the wars that faced. Continuing, the Brazilian index is more than double that of countries like Spain and Germany, which have 8.5% (National Institute of Statistics - INE, 2008 [38]) and 9.4% (Destatis Statistisches Bundesamt, 2013 [39]) of the population. In the Latin American continent, Argentina and Chile have 12.9% (National Statistics and Censuses – INDEC [40]) and 12.7% (Ministry of Social Desarrolo – SEMADIS [41]), respectively, still far from Brazil, as shown in Table 4.

Countries	Year	Population (in million)	Disabled People (in million)	%
Brazil	2000	169,8	24,281,400	14,5%
Spain	2008	46,239,271	3,847,900	8,5%
Brazil	2010	190,7	45,577,300	23,90%
Argentina	2010	39,671,131	5,114,190	12,9%
USA	2010	308,758,105	56,700,000	19%
Chile	2012	16,634,603	2,119,360	12,7%
Germany	2013	81,2	7,500,000	9,4%

Table 4 – Population vs. People with Disabled.
Source: made by the author as from [37], [38], [39], [40] and [41].

The evolution of cars and motorcycles number led to the growth of traffic accidents. Deaths and serious injuries are most in motorcycle accidents; it is considered a dangerous vehicle and requires attention and driver's equilibrium in time to lead it [27]. Each year there are about 340,000 accidents, with victims, who survive. There is no precise statistics on people who acquire a disability, but it is something disturbing, 25% of people who have suffered traffic accident are left with sequels, which are loss of movement, limited mobility or organs [42]. In addition, urban violence has grown a lot in robberies, thefts and assaults.

In addition, the aging population plays an important role in this statistic. The World Health Organization - WHO (2015) reported that by 2050 Brazil, tripling the number of people over 60 and growing faster than the international average and aging faster than you think. Brazil in 2015 had 12.5% of the elderly and should reach 30% by mid-century. The WHO classification for countries with more than 14% of the elderly is aged "nation" [43]. According to Figure 2 of the IBGE (2015), there is an increase in life expectancy over the past 15 years.

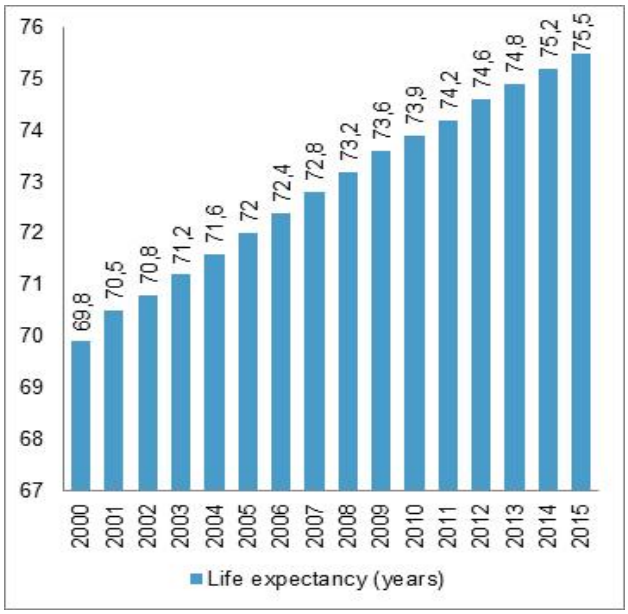

Figure 2 – Life Expectancy at birth (years) – Brazil – 2000-2015
Source: IBGE – Projection of the population of Brazil - 2013

Life expectancy has increased considerably, especially with the advancement of modern medicine. Not all seniors have a disability, but the physical limitation is relatively higher in this group [7].

One of the factors for the increase in life expectancy was the decrease in infant mortality rate in 2000 killed 29 children in every thousand born, in 2013 dropped to 15 and esteemed that in 2060 a fall of 7.1 deaths according to Figure 3.

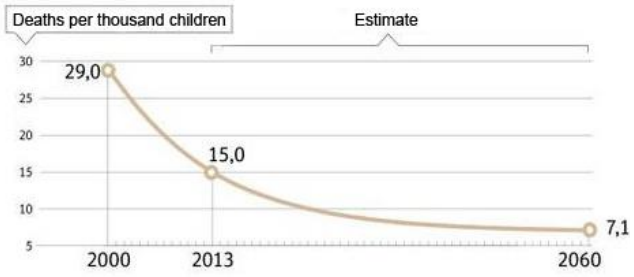

Figure 3 – Child Mortality Rate – IBGE Projection - 2013
Source:https://fernandonogueiracosta.wordpress.com/2010/12/16/piramide-etaria-brasileira/, access on April 12, 2016.

Another factor for the increase in life expectancy occurred with decreasing fertility rate. In 2000, the average number of children per woman was 2.4; in 2013, it reached 1.8; esteemed 1.5 in 2060 as shown in Figure 4.

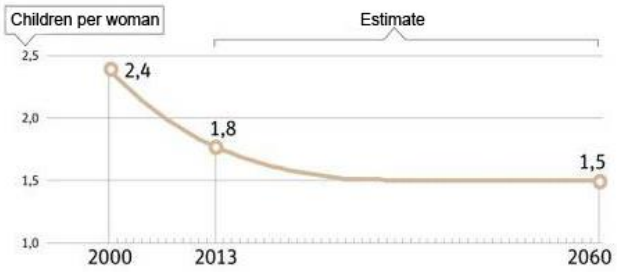

Figure 4 – Fertility Rate – IBGE Projection - 2013
Source:https://fernandonogueiracosta.wordpress.com/2010/12/16/piramide-etaria-brasileira/, access on April 12, 2016.

The reasons for the decline in fertility were the women's role change in society, greater integration in the labour market, increased education and family planning.

The Brazil 1960 had the same profile of Africa 2005 many young people and children according to Figure 5.

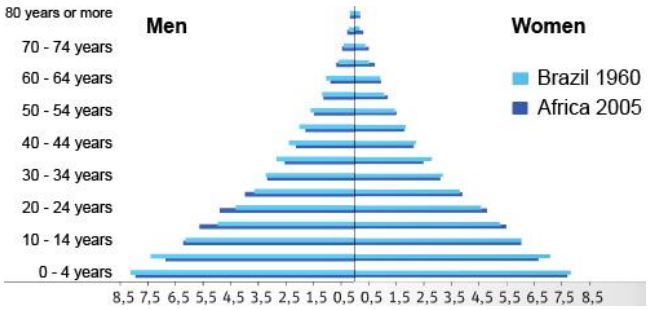

Figure 5 – Age Pyramid – Africa 2005 and Brazil in 1960 (%)
Source:http://www.senado.gov.br/comissoes/CDR/AP/AP20080417_IBGE_Apresenta%C3%A7%C3%A3oContagem_FPM.pdf, access on April 12, 2016.

Figure 6 shows the change of the age pyramid in Brazil in 2013 compared to 1960 of Figure 5, and projections for 2040 (fig. 7) and 2060 (fig. 8), esteemed that more than a quarter of the population over 65 years as the IBGE projection.

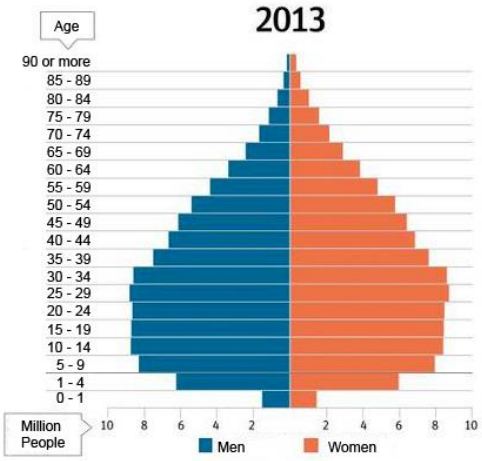

Figure 6 – Age Pyramid – Brazil in 2013 (%)
Source: IBGE – Projection of the population of Brazil - 2013

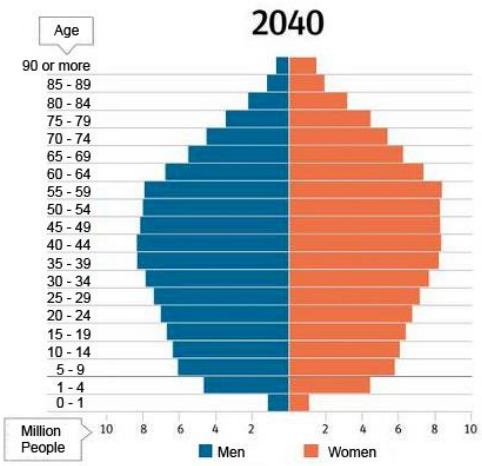

Figure 7 – Age Pyramid – Brazil in 2040 (%)
Source: IBGE – Projection of the population of Brazil - 2013

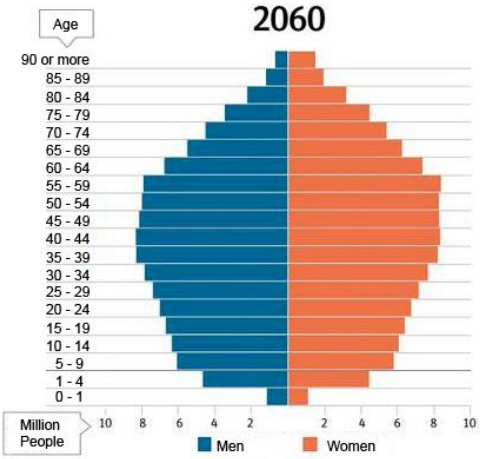

Figure 8 – Age Pyramid – Brazil in 2060 (%)
Source: IBGE – Projection of the population of Brazil - 2013

Therefore, all statistics about people with disabilities, presented and the aging of the population, show how the accessibility and universal design issues should be privileged in the world. The practices of social inclusion through adaptations of buildings, cities and especially the integration of people with disabilities and elderly is "(...) indispensable attribute of a society that wants to be more inclusive (...)" [12]

IV. RESULTS

In Sao Paulo, some places have undergone adaptations accessibility, in compliance with Federal Decree 5,296/2004, the NBR 9050:2015 ABNT and relevant legislation. We see as example, the results of the arrangements with the Latin America Memorial, Oscar Niemeyer project, inaugurated in 1989, according to Figure 9, notice the inclined path platform, along the ladder to bridge the gap exists at the Gate 1.

Figure 9 – Inclined path platform – Gate 1
Source: Photographic Archives Lucas de Souza Ramalhaes Feitosa (the author).

The tactile map (fig. 10) next to Gate 1 has great importance as it helps people with visual impairment to understand the site and get to know the space.

Figure 10 – Tactile Map – Latin America Memorial
Source: Photographic Archives Lucas de Souza Ramalhaes Feitosa (the author).

This tactile map connected with the directional tactile floor leading to visually impaired person to existing buildings.

Another example: Bus Terminal Tiete, original design of architects Renato Viégas and Roberto Mac Fadden 1977 and underwent adaptation accessibility and reform, the office of G. Kalili Freitas and Architecture from 2001 to 2005. The main entrance road is located near the area of car landings, and as figure 11, there is the concern with the signalling route accessible by elevators made by ISA and tactile floor alert along the stairs and elevators.

Figure 11 – Tactile Map – Latin America Memorial
Source: Photographic Archives Lucas de Souza Ramalhaes Feitosa (the author).

Note from the Reference Module forecast - MR (1.20 x 0.80) with the waiting chairs as Figure 12.

Figure 12 – Tactile Map – Latin America Memorial
Source: Photographic Archives Lucas de Souza Ramalhaes Feitosa (the author).

Therefore, these two examples in the city of São Paulo show the concern to meet and include people with disabilities in cultural programs such as the Latin American Memorial and to be able to travel, as in the case of the Tiete Bus Terminal.

V. FINAL CONSIDERATIONS

Part of the world population has some form of disability and are subject to some form of discrimination, social exclusion and some cases, neglect of public power.

The article shows the emergence of modern concepts of accessibility from the post-war, the search for the elimination of architectural barriers, concern with universal design that aims to serve the greatest number of people, regardless of physical limitations or not.

The wars brought to the rulers and to the UN the existence of the problems social inclusion of people with disabilities. People with disabilities need open spaces of architectural barriers to exercise their activities and over the years and there was an enrichment in relation to knowledge about accessibility.

The data showed the growing number of people with disabilities in various countries and population aging in Brazil. Despite the existence of UN international conventions that guarantee the rights of

persons with disabilities and that are adopted by many countries, it has a lot to do in the case of Brazil.

In Brazil, there are rules and laws, considered the most advanced in the world, but still lack apply them fully and satisfactorily to promote the social inclusion of people with disabilities. Accessibility and universal design are fundamental rights for people with or without disabilities, ensuring the ability to move through the spaces independently. Accessible spaces should be valued by society, which must pass the question, which public and private policies adopted in Brazil. Accessibility in order to improve them and make them more effective.

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