

# **A proposed Vision to Achieve Easy Use for People with Special Needs in Service Elements, Devices and Technical Installations in Buildings**

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## **Abstract:**

People with special needs and people of determination are an integral part of society, hence the research discusses a new vision in dealing with disabled people in buildings, so that they can be integrated into society and contribute to life in addition. This can be achieved by designing buildings, roads and even friendly cities by providing some conditions, and updating and developing them according to modern design techniques. The research is exposed to achieve and meet these needs within the service parts of the building, the technical devices and installations. As the research reviews its problem represented in neglecting those technical installations and the necessity of updating them according to modern and developed technology, then the importance of the research and its assumptions, limits and its theoretical methodology. The research also discusses the requirements proposed to work with their application in the control tools of the building operation through the empty spaces, electrical outlets, taps, buttons, information signals, lighting panels and the uses of colours, as well as some technical installations to be developed in service architectural spaces in the building, and in public and private toilets inside the building in terms of location, toilets cabins, signs, doors, interior fittings, requirements for handles, lighting, and interior finishes. As well as the requirements that must be met by using modern technology in sanitary devices, such as a toilet device, sinks, urinals, bathtubs, shower rooms, cabins (showers), toilet accessories, and in changing rooms in toilets, that is explained with a proposal for the required sizes and figures, then making research recommendations and references.

## **Keywords:**

Technical installations. People with special needs. Universal access. Service elements. Fixtures.

## **1. Introduction:**

Disability, with its multiplicity of audio, visual, and kinetic forms among other forms of disability is considered one of the most important challenges that may entail some obstacles that restrict the movement of its owners, which may limit the interaction of people with special needs in society. Here came the role of the architect in overcoming those obstacles and facilitating universal access in all of the building elements inside and outside it. So that it makes them feel that they are an integral part of society, and here the architect deals with determining the possibility of allocating special and appropriate tools for movement that allow them to reach what is wanted inside the building in a safe and comfortable manner. The research discusses a vision to achieve comprehensive access to those with special needs in the service parts and elements in the building, and the technical equipment and installations in the buildings.

**2. Research problem:**

It was noticed that not all the needs of the architectural applications, elements and requirements for people with special needs are known in buildings of all kinds, such as educational, cultural, health, public transportation and others. It was also noted that some of the requirements set and applied do not meet most of these needs where the disability differs. The architect must apply those conditions that have been neglected and which may face some of them, as well as some important requirements in technical installations.

**3. Importance of Research:**

The importance of the research is summarized in the importance of integrating people with special needs and people with disabilities in all its forms in life through the use of buildings and in architecture and urbanism. This increases the exploitation of the energy of all members of society, which will positively affect various economic, social and other aspects.

**4. Research hypotheses:**

The research assumes the existence of the basic building block in knowing the needs of people with disabilities in buildings inside and outside it. It is also assumed that there are some applications that had to be developed and modernized according to modern and emerging technologies on technical installations in buildings such as the use of lasers and automatic sensors, temperature sensors and automatic closing and opening techniques , the use of sensors and nanotechnology applications in architecture, design of sanitary devices, molding and implementation of 3D printers, providing them with all modern technologies, and the use of computer programs in design, implementation, the internet and other new technology on technical and sanitary installations in buildings, architecture and urbanism in general.

**5. Research limits:**

The research focuses on enumerating a number of techniques that are used by people with special needs, which may meet some of their needs in dealing with the building in terms of its use and operation. The research is concerned with the health and technical installations in the buildings.

**6. Research methodology:**

It is necessary to update and develop the necessary elements and conditions - to meet the needs of people with disabilities in all their forms and figures - according to the development of design techniques for them to keep pace with the times in creating buildings friendly to people with special needs. This is done through conducting a theoretical study of these requirements, then coming up with some conclusions and recommendations.

## 7. Control tools and building operation mechanisms:

Table No. (1) shows the requirements that suggested to be met in these elements.

Element	Requirements that suggested to be met	
	Suggested dimensions	Description
<b>General</b>	It should be suitable for all users, including children, people with disabilities, as well as those with arthritis and those who suffer from difficulty in balance, and flat buttons, modern touch screens, and non-marked tools should be avoided as they are not suitable for people with visual impairment (Braille). (1)	
<b>Floors</b>	80*140 cm	A minimum area of 80 x 140 cm must be provided to allow mobility devices for people of determination to approach front and side and turn.
<b>Operating parts</b>	On a height 90-120 cm	They are placed at a height of 90-120 cm, and the elevator and door operators should meet their requirements.
<b>Exits electrical</b>	On a height of 45 cm no more than 90 cm	The middle of the sockets and the like of it shall be placed at a height of 45 cm and not higher than 90 cm from the floor as a minimum. (2)
<b>Taps</b>		It is preferred to operate and activate it electronically (with laser beams or thermal sensors) and when operating manually it must be done with one hand and with a force not exceeding 22 Newtons as a maximum.
<b>Buttons</b>		The activation surface of the buttons should be higher than the surrounding surfaces, as it can be distinguished for the visually and mentally impaired.
<b>Information</b>		Alternative tangible characters or audible characters for the visually impaired should be provided.
<b>Intuitive use</b>		It is preferred to design, develop and organize the various control tools and operating mechanisms in a simple, clear and intuitive way for people of determination and people with special needs.
<b>Lighting</b>		The illumination should be a minimum of 100 lux, rising to 200 lux when reading is required.
<b>Color contrast</b>		Controls and operating mechanisms must differ in color from the surrounding surfaces, and clear colors that can be distinguished and can be described should be used. (2)

## 8. Techniques of artistic installations to be created and developed in the building's service architectural spaces:

### 8-1 Public and private bathrooms in the building:

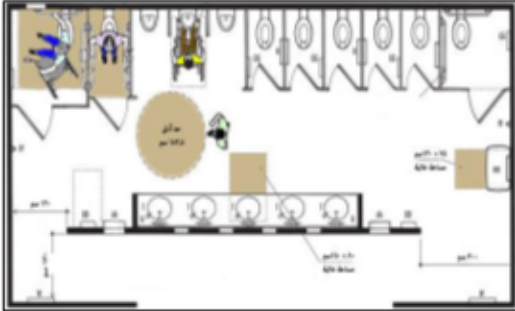


Figure (1) shows an illustrative horizontal course for the movement of people with special needs inside the toilets, with the necessity of creating a suitable middle empty movement space inside the bathroom in order to allow movement and rotation of the chair, in addition to making cabins designated for them with side holders with a height of no more than 70-90 cm. Source (1)

Table No. (2) shows the newly introduced and proposed requirements for the public toilets of the building:

Element	Requirements that are suggested to be met. (As a minimum)
<b>Location</b>	It is accessed via an accessible pathway to enable people with disabilities to use it alone or with the assistance of others if necessary. All visual and physical signals, such as Braille, must be provided on the floor of the building for the visually impaired when approaching these sites. (3)
<b>Cayenne toilets</b>	Minimum provision for the cabins assigned to them is 1:2
<b>Unisex bathroom</b>	At least one bathroom for each gender must be provided in each building for people with special needs, so that it is easily accessible and equipped with all modern technologies that allow easy, simple and intuitive use.
<b>Banners</b>	Symbols, images, and strong and clear contrasts are used in colors, and prominent symbols that may be read aloud when in contact with the visually impaired should be used.
<b>Empty spaces inside the bathroom</b>	<ul style="list-style-type: none"> <li>- Provide an area of at least 160 x 140 cm in front of the easy-to-reach course entrance to allow the chair to turn 180. Figure (1)</li> <li>- Providing an area of 80 x 140 cm in front of the basins, and 50 cm deep below them.</li> <li>- The minimum empty depth between the toilet cabin and the basin facing it is at least 150 cm.</li> </ul>
<b>Transmission space</b>	Provide a space beside the toilet free of obstructions, with a width of 90 cm and the full depth of the room, preferably aligned with the door, and the width can be reduced to 80 cm in renovations and a unit to dispose of napkins is sunken or protruding with a maximum of 10 cm inside. Figure (1)
<b>Doors</b>	<ul style="list-style-type: none"> <li>- The minimum net width is 90 cm and it opens to the outside unless an internal space of 80 x 140 cm is available.</li> <li>- - It is preferable to open the door of the toilet cabin outward because when a disabled person has fallen, lifeguards may not be able to open the door in.</li> </ul>



- With regard to visual impairment and low vision, the use of Braille, contrast in colors, and the provision of appropriate lighting for the use of spaces are elements that contribute to guidance in buildings.
- With regard to mobility impairment, providing slides, avoiding stairs and providing elevators does not only contribute to providing a friendly internal environment for people of determination, but rather the heights of cushions, floor paving, techniques of opening and closing movements of doors, and the method of locking them so it can be opened from the outside if it is necessitated. All of these examples of requirements must be implemented and updated according to the development of technology.
- Developing and modernizing buildings to be friendly buildings for people of determination that does not affect the quality of the building negatively. Rather, this increases the productivity of the building because it exploits all hesitant and used human energies.
- Dealing with the problem of people with special needs is one of the elements that indicates the development and progress of nations.

## 9. Recommendations:

- It is recommended to use modern technology in all installations for people with disabilities in buildings in order to integrate them into society through making friendly buildings for them.
- Sensors, lasers, and thermal sensors are recommended in the technical installations of buildings for people of determination.
- It is recommended that updates to be made for installations already located in service areas in buildings.
- It is recommended to make clear and contrasting signs that indicate the location of the service places.
- It is recommended that the buttons panel for operating the whole building or its parts to be made in braille and in clear and easy-to-reach places.
- It is recommended that heights of handles and cushions be taken into account, not exceeding 120 cm in height, so that it is the height of the person sitting in the wheelchair.

## 10. Conclusion:

The research tried to find a proposed vision for some requirements for technical installations in buildings that facilitate the dealings with people with special needs, and that it is based on the idea of integrating people of determination and people with special needs into society. Communicating to them the idea that they are an integral part of this community. These installations may already exist, but lacked modernization and development according to the technological development in architecture and in buildings.

And where the aim of the research and of these technologies in the first place is to integrate people of determination into the societal and economic cycle, starting with finding solutions with the surrounding environment and developing them and bypassing the barriers of space in buildings with different purposes. Whether they are residential, administrative, educational, cultural, health, etc., which are felt by people with special needs. The research was able to inspect the defect areas and conclude alternative solutions by presenting examples of technical installations that should be developed in the building's service architectural spaces.

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