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ACCESSIBILITY AND INTELLIGENT BUILDINGs

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BUILDING ORIGINS

In ancient times, the first shelters used by man were transitory and mobile due to the nomadic lifestyle of that time and easily transportable materials were used. Later, permanent constructions started to be built, as humans began tobe settled down. Stone, baked clay bricks and dust mixed with water, began to be used, followed little by Little,by iron, steel and reinforced concrete and finally different polymeric materials were introduced. But a main element has been common along all ages regarding to the spatial organization of peoples, which gave rise to architecture, it is the idea of shelter. The concept of shelter has been present in the subconscious of past societies, marking their culture to present day.

In our cities and rural areas, we can see very different buildings, in general we are going to classify them into two types, buildings for residential use (housing) and buildings for non-residential use (health, educational, recreational, administrative, cultural, commercial, religious use, etc.). Perhaps buildings for non-residential uses are evolving and revolutionizing architecture the most, so the most innovative, avant-garde, accessible and sustainable materials, techniques and technologies are being used, but in looking at the situation of lockdown,this article is focused on buildings for residential use.

Buildings for residential use are those used as permanent accommodation for people and where all day-to-day activities are carried out. When we were little and we used to play tag, when

someone was about catching you, you used to say "home" and there you were safe until a partner came to rescue you. Today in an unprecedented crisis and health emergency, we have been told to "stay home", as the most effective measure to combat this epidemic. For all these reasons, housing is the vital unit.

Human beings who live in these homes are diverse by nature, heterogeneity is innate, but there are also many people with disabilities who have to stay locked up in their homes on a daily basis. The existence of obstacles and the lack of elevators prevents them from go out into the street and just like in the tag game, they have to wait for someone (relatives, neighbours, Red Cross assistants, health services...) to come and rescue them so they can go to the street to carry out daily tasks (such as doing shopping, going to vote, going to the doctor, managing a procedure in a public body, going for a walk, etc.). In this context, accessibility takes a special relevance, it must be considered as the key element and constitute the fundamental pillar in the design to adapt to the needs of its users and not the other way around. At the same time, technology is the tool that serves as a basis for accessibility to reduce dependency situations and increase the autonomy of people with disabilities.

Accessibility is a fundamental right of people and not an option that can be chosen based on the capacity, disability, sensitivity, mentality or commitment, and to be so it is protected and collected by law: at international level by the Universal Charter of Human Rights in its articles 1 and 2 and by the International Convention on the rights of Persons with Disabilities of the UN in its article 9; At European level, the European Council is the one that has bet the most for the need to harmonize rights and obligations in relation to diversity with the approval of

conventions and recommendations (European Strategy on Disability 2010-2020: a renewed commitment for a Europe without barriers), at national level by the Spanish Constitution of 1978 in its articles 9, 14 and 49 and more specifically by Royal Legislative Decree 1/2013 (of November 29th, which approves the revised text of the General Law on the rights of people with disabilities and their inclusion social), which consolidates the Law of Social Integration of the Disabled, of April 7th, 1982, Law of Equal Opportunities, Non-Discrimination and Universal Accessibility 51/2003, of December 2nd, 2003 and Law 49/2007 (of December 26th , which establishes the system of infractions and sanctions in terms of equal opportunities, non-discrimination and universal accessibility for people with disabilities), by Royal Decree 173/2010, of 19th February, which modifies the Technical Building Code, in terms of accessibility and non-discrimination of people with disabilities (Security of Use and Accessibility Basic Document) and by Royal Legislative Decree 7/2015 of October 30th, which approves the consolidated text of the Land and Rehabilitation Law that consolidates the Land Law and Law 8 / 2013 Urban Rehabilitation, Regeneration and Renovation, also at regional and municipal level.

Technology is the application of science to serve us, with significant progress in recent years, its main objective has been to make our lives easier, more comfortable, and safer, solving everyday problems. Specifically, for people with disabilities, it is an important stimulus to increase their autonomy, promoting independent living and improving their quality of life.

ACCESSIBILITY IN INTELLIGENT BUILDINGS AND HOME AUTOMATION

The origin of home automation dates to the seventies, when the first automation devices appeared. In the late 1980s and early

1990s, SCE (Structured Cabling System) began to be incorporated into buildings to facilitate the connection of all types of terminals and peripherals to each other, using cables and sockets distributed throughout the building, these were called intelligent buildings. Later, the automatisms intended for office buildings, and others, began to be applied to private homes, giving rise to home automation.

Home automation is therefore integration of automatisms related to electricity, electronics, robotics, information technology and telecommunications, with the aim of ensuring the user an increase in comfort, security, energy savings, communication facilities, possibilities of entertainment and increase of accessibility level could be added. Home automation seeks to integrate all the appliances and devices in the home, so that they work in an orderly manner and with minimal user intervention, being manipulable both from inside and outside the home.

All the installations that can be carried out in a home automation system provide home users with infinite number of benefits. These are some examples: activating the light, raising and lowering the blinds, installing a video intercom that identifies faces and tells you who is calling through the mobile, having a digital peephole to report on the computer or mobile phone who is ringing the bell, having a digital lock that does not need keys to enter and can be activated by mobile phone or that identifies you and lets you in, locating presence detectors, detectors of emergency (smoke, water, gas), activating alarms via streaming, warning the firefighters, closing the stopcocks, or connecting entertainment systems through various platforms.

The benefits these systems can provide are related to:

- ***Comfort**. It maximizes quality moments at home, adapts to the changing needs of users and improves living conditions.*
- ***Health**. It guarantees good environmental conditions and rest time, protects from dangerous situations and warns of abnormal situations.*
- ***Savings**. Greater energy, time, money and worry savings are achieved by knowing what happens at home when you are away from it.*
- ***Connectivity**. There is continuous communication with the home and its inhabitants, which allows to act quickly and remotely control from anywhere.*
- ***Privacy**. Protection against inclement weather, ensures privacy with respect to people outside the home and ensures safe access.*
- ***Aesthetic**. Fewer mechanisms on the walls, maximum functionality in less space and maximum use of lighting to create different environments to experience sensations.*
- ***Sustainability**. Better consumption of energy and natural resources, less environmental pollution, changes in environmental habits, visibility of consumption to make users aware of their actions at home.*
- ***Accessibility**. It offers the ability to manage the home autonomously, reduces the degree of dependency since with a single interface (control, computer, tablet, telephone, etc.) all devices in the house can be controlled (lights, temperature, music, windows... even a transport crane). This possibility improves mood, self-esteem and empowerment since all the elements can be managed from the remote controlusing voice recognition commands, blowing, blinking*

or even with the movement of the iris. Confidence is also accentuated because warnings and/or alarms can be sent in case of emergency, communication with the outside world (friends, co-workers, etc.) is encouraged, intercommunication with relatives, assistants, telecare services and home helpers is facilitated, and costs in assistance services are saved.

- ***Future. Automation is adaptable and expandable according to the inhabitants´ needs and the circumstances of society, such as the current moment in which we live, so it can be prepared for teleworking and online shopping, compatible with the IoT and wearables, ready for eHealth and medical care through distance and prevented for possible energy, health, security crises, etc. as well as possible legislative changes.***

Home automation for people with disabilities is more than a luxury, it is a help tool, and even a necessity to be able to develop and carry out daily activities autonomously and independently. Technologies offer real and effective answers and solutions and contribute to the process of social, educational and employment integration. Enjoying a home without obstacles is the dream of many people with disabilities and home automation is the tool to make it possible, without forgetting the digital gap that can occur. Accessibility is necessary to be includedin the design of devices, their cost, the ease of interaction, handling and understanding. Accessible home automation must be designed for all people, easy to usewithout great skills, intuitive, flexible, easy to handle with error tolerance and affordable.

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HOME AUTOMATION APPLICATIONS