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Spatial and Design Analysis of Sanitary Units in Primary School "Toso Arsov" Shtip to Improve Inclusive Education

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Abstract

Accessibility is an everyday problem within the framework of the built environment. Accessibility problems become an urban, architectural and design challenge in the planning of the built environment and the development of an inclusive society that provides a comfortable and humane living environment according to people's needs.

Educational facilities are key to the development of a society. They exist and function as such with the same purpose in different periods of time, according to different legal frameworks that were in force at that time. From that aspect, we can also see the diversity in the approach to the design and accessibility of the facilities, depending on the current political and social circumstances, as well as the awareness of the needs of people with disabilities in the given period of time.

The paper includes a specific example of a facility for primary education, in which an analysis of the sanitary units was made from the aspect of accessibility. For this purpose, a design analysis was made for the use of the space that is already functioning for the same purpose and the possibilities for adaptation. Through this analysis, advantages and disadvantages can be perceived about the use of space and its functional utilization.

Keywords: accessibility, design, space, education, inclusion

Introduction

Educational facilities, as institutions in which the educational process takes place, have an especially important role in the implementation of the teaching content and the creation of a comfortable environment for learning. This means that the architect plays a crucial role in the quality of the educational process in a country. Although educational buildings were built in different periods of time, where there were different conditions for design and building, they still managed to adapt to all the reforms of the educational process over the years and functionally satisfy people's needs.

When it comes to people with disabilities and their participation in the educational process, as well as in all social spheres, things have visibly changed. The awareness of the needs and rights of persons with disabilities in the past years, was not present among people, even among the relevant authorities who had the power to make changes and reforms to solve the problem. Therefore, such laws and standards were not considered in the design and construction of the facilities of that time. In terms of educational facilities, persons with disabilities were integrated into special school facilities or separated classes within the same facility, specially designed for that purpose. That means the concept of inclusion in education and in society is a new concept that is increasingly present today. Although education facilities and their accessibility are only a physical obstacle to the realization of inclusive education, it is still one segment of the whole package that needs to be solved for the final implementation of the main goal.

The school that is the subject of analysis in the text below is located in the Municipality of Shtip, built in 1977 and designed years earlier, but under the same political-economic and social conditions. Accessibility in schools can be analyzed from multiple aspects including urban parameters and architectural elements that allow access to and in the building. In this paper, the analysis will focus on the sanitary units as a space that will undergo design analysis in relation to the current functional solution and possible variants for creating accessible sanitary units for all users, including persons with reduced mobility. Through the design, transformation will be given an overview of the positive and negative sides of both models.

Inclusive Education

Because of the close connection between the concepts of inclusion and disability, inclusive education has appeared as a social model of disability in some ways. Inclu-

sion has a much deeper meaning than the integration of children with disabilities in the educational process and refers to a sense of belonging and equality. (Trębicka-Postrzygacz B., 2018)

Every country must strive to realize and implement inclusive education, which includes educational facilities accessible for free movement and manipulation by persons with disabilities. The development of any society depends on the opportunities to develop the intellectual potentials of all its members equally. This theme is supported by Auf-Franić H., pointing out that persons with physical disabilities can develop their full potential and civil rights only if the entire environment is adapted for their free movement. (Auf-Franić H., 2003)

In an architectural context, inclusiveness is terminologically related to universal and inclusive design, as well as to design without architectural barriers. The concept of a universal design is introduced in architecture by architect Ronald Mace. He argues that architectural principles will help persons with disabilities to have access to the built environment, but it will also help people without disabilities. (Connell B.R., 1997)

Within the design of educational facilities, the architectural barriers that prevent the inclusion of children with disabilities are not found exclusively in the building itself. This includes roads to the school, which can be through main traffic arteries, sidewalks, and footpaths. It depends on the location of the facility, so in that context, one of the factors in designing an inclusive school is the urban planners who determine its location. From that aspect, inclusiveness enters into architecture and urbanism as a prerequisite for the implementation of inclusive education within the framework of an inclusive society.

Inclusive School

One of the main ways to improve the inclusion of children with disabilities in the educational system and to create inclusive learning environments is through incorporating the principles of universal design into educational facilities. (Agarwal A., 2020)

The architecture in schools contributes to providing a comfortable learning environment for children and staff. It refers to a location that will be easily accessible and an interior space that can be easily manipulated. This can be realized by designing according to the legal norms intended for designing public facilities, i.e.

educational facilities. This includes parameters such as the width of doors, paths, corridors, handrails, benches, and devices accessible to children with disabilities, information boards suitable for different types of disabilities, ramps and entrances adapted to the abilities of all children, and many other details that will contribute to the implementation of inclusive education.

Today, the current *Law on Primary Education* in the Republic of North Macedonia (Official Gazette 161/19,229/20) has been visibly changed in relation to the time in which the building of the “Tosho Arsov” Primary School in Shtip was designed and constructed. Article 11, from the current *Law on Primary Education*, refers to inclusive education, and its views include:

- Primary education is institutional, personnel- and content-organized in a way that supports the inclusion of all children in regular primary education;
- Inclusive education is a process that considers the various individual needs for the development of students, offering equal opportunities for the realization of basic human rights for development and quality education.
- Inclusive education involves changes and adaptations of teaching content, approach, structures, and strategies for students with disabilities, with a common vision and conviction that the state has an obligation to provide education for all children;
- The inclusion of all children in regular primary education is defined by the Concept of Inclusive Education, which is adopted by the Minister on the proposal of the Bureau and is published on the websites of the Ministry of Education and Science and the Bureau.
- The infrastructure, the individualized support, the curriculum, and program in primary education are reasonably adjusted according to the individual needs of the student;
- Reasonable adjustment is the modification and adaptation of the conditions of training and education in a particular case, which does not cause a disproportionate and unnecessary burden on the school and is aimed at ensuring the enjoyment or realization of all human rights and freedoms of students with disabilities on an equal basis with the others;
- Accessibility to infrastructure and services implies taking measures that ensure that students with disabilities have access, on an equal basis with others, to the physical environment, transport, information, and communication, inclu-

ding information and communication technologies and systems in the primary school.

The last paragraph, 7, from Article 11 of the Law, clearly provides accessibility as one of the conditions that must be met for the implementation and realization of inclusive education.

From an architectural and constructive point of view, according to the *Rulebook on Design Standards and Norms* (Official Gazette 60/2012, 29/2015, 32/2016, 211/2020), when designing schools, standards and norms from Article 9 are applied, which are referred to several architectural parameters and elements that should be satisfied. In this paper, the analysis refers to the sanitary units as one segment of the entire facility and according to this rulebook, a minimum of two sanitary units (one male and one female) should be designed for one classroom. (Сл. весник на РСМ бр. 60, 2012)

Special Norms and standards for space, equipment, and teaching aids for primary schools in the Republic of North Macedonia were provided in 2020 by the Minister of Education and Science, based on Article 23, paragraph 1, subparagraph 3, and paragraph 3 of The Law on Primary Education. (Сл. весник на РСМ бр. 161, 2019)

According to these norms prescribed for primary schools, a classification of schools is made by degree of development, and certain standards are given in relation to the dimensions of the interior spaces, access, and functional layout of the school facilities. (Министерство за образование и наука, 2020)

Regarding sanitary units in newly designed schools, it is necessary to design sanitary units adapted for students with disabilities. During the reconstruction and adaptation of existing schools, adapted sanitary units for students with disabilities should be provided by the Rulebook on technical standards for planning, designing, and building facilities;

More specific measures on accessibility in educational facilities for persons with disabilities are given in the *Rules on the manner of providing uninterrupted access, movement (horizontally and vertically), stay and work of persons with disabilities to and in buildings with public and business purposes, buildings intended for housing in residential buildings, as well as buildings with residential-business purpose.* (Сл.весник на РСМ бр. 17, 2015)

Accessibility elements for independent functioning, from the perspective of schools, include entrance space, communications, sanitary units, classrooms, and

installations. Sanitary units (Article 18) should have a door with a clear width of at least 90 cm, which opens to the outside, a toilet bowl with a height of 45 - 50 cm, next to which two handrails with a length of 90 cm will be installed, placed on the wall at a height of 80 to 90 cm from the floor surface. The distance of the front edge of the toilet bowl from the wall should be at least 65 cm, and the water release button from the toilet cistern should be at a height of 70 cm from the floor surface. The sinks should be console with a width of at least 50 cm and placed at a height of at least 80 cm. The free space in front of the toilet bowl and in front of the sink should be at least 90 cm, and the free space for wheelchair rotation is within a radius of at least 150 cm. Clothing hangers should be placed at a height of 120 cm.

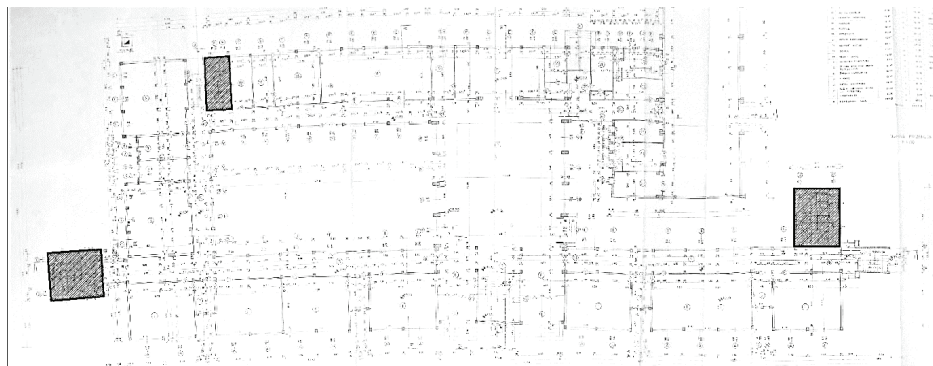
These several articles are part of the valid legal provisions for the construction and design of schools in the Republic of North Macedonia. Apart from measures that ensure general accessibility in schools, specific adaptations are also needed that meet the individual needs of children with disabilities. The Convention on the Rights of Persons with Disabilities defines reasonable adaptation as necessary and proper modification and adaptation, not imposing a disproportionate or unnecessary burden, to ensure to persons with disabilities the enjoyment and realization of all human rights and fundamental freedoms on an equal basis with others. (United Nations, 2006)

Analysis of Sanitary Units in Primary School "Tosho Arsov" Shtip

According to the project documentation, the square footage of the school is 3600m² and according to the program, it was planned to design 16 classrooms, divided into 8 classrooms for the lower and higher grades, and because the teaching was of the cabinet type, a total of 8 cabinets were designed, one by two classrooms. As part of the building, four cabinets with auxiliary rooms were provided within the teaching section, and a music cabinet with a pantry. In the administrative part of the school, we were provided an office with a dressing room, a meeting hall, a director's office, and an office for the secretary. A kitchen with a dining room and a warehouse were provided for the students' food, and a classroom was used for housekeeping. A separate room was provided for the technical staff. In the section for sports activities, a teacher's office, wardrobes with sanitary units, and a sports hall were provided. Separate sanitary units were provided in all separate functional parts (Figure 1).

Figure 1

Ground floor plan in project documentation



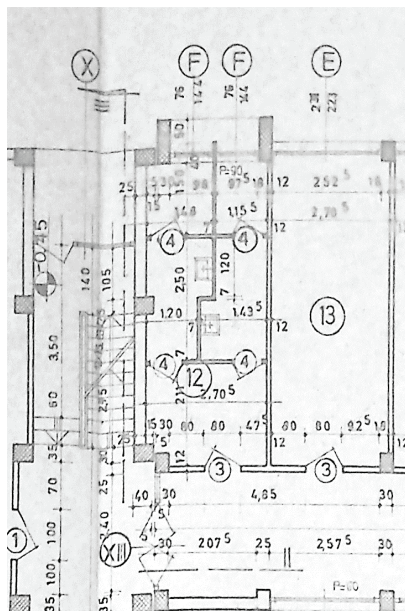
Note. This figure is archive material from original project documentation.

Today, the school works with the same number of classrooms, of which one classroom has computer equipment, one multimedia classroom equipped with computers, a projector, and an interactive board, public areas, three exits in case of elementary accidents, and shelter and sanitary units. Subject teaching from VI-IX grade is realized in classrooms for all subjects. The school today works in two shifts, i.e. one shift of classroom teaching from I-V grade and another shift of subject teaching from VI-IX grade. (ООУ „Тосо Арсов“, 2020)

The sanitary units in the central school building meet the needs and ability of the students because they are according to the prescribed standards and norms. Some of them have been renovated, and some need repair of damages caused by long-term use.

Figure 3

Sanitary installations in project documentation, type 2



Note. This figure is archive material from the original project documentation.

To improve the conditions for people with disabilities in schools in the Republic of North Macedonia and provide an accessible physical environment for all people equally, an adaptation of the existing sanitary units in the selected school was made. For that purpose, the existing surface used for the same purpose was taken as the subject of adaptation through two different methods of adaptation:

- 6) design of a special unit within the sanitary units for separate genders.

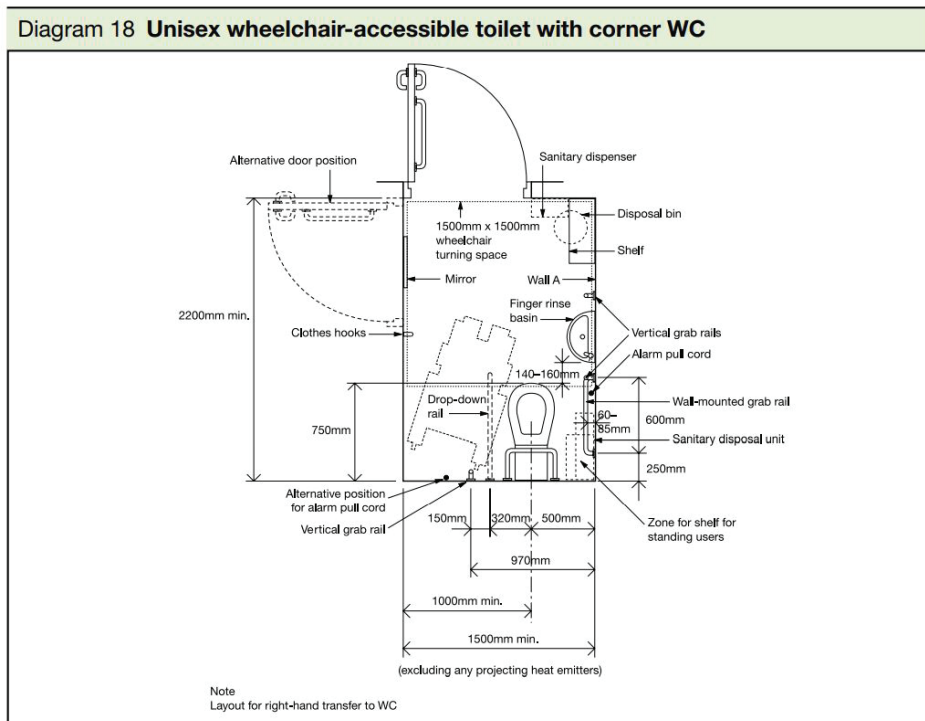
These two approaches in providing accessible sanitary units for persons with disabilities depend on the possibilities of the existing facility and on the size and position of the space in the facility. Also, a crucial factor is the access to the space intended for the accommodation of sanitary units and the possibility of changing it. For wheelchair users, a better option is to design an independent universal unit where they can get help from another person if necessary. An enlarged unit in the

sanitary units for separate genders is a convenient solution for enabling the use of people with reduced mobility who use aids, as well as parents with children. The possibilities for adaptation of existing sanitary units depend on the current size of the used area, so the most acceptable solution is chosen accordingly. The problem of accessibility of sanitary facilities in schools is common in our society, considering that the needs of people with disabilities in previous years were not included as a legal obligation in the design and construction. By raising awareness of the needs of people with disabilities as equal participants in the educational process and a condition for the implementation of inclusive education, there is a need to adapt the already existing space in schools. Both variants of adaptation and modification of the space are shown here for its use with the same purpose but with improved characteristics.

The first model of modification is the design of a universal sanitary unit accessible to wheelchair users, located as an independent unit separated from the rest of the sanitary units. This model enables freer use and greater accessibility for people with disabilities because they are separated from other users. Access to this type of sanitary unit is free and direct from horizontal communication, making it available at any time. The advantages of this model are easy and quick recognition and visibility, greater availability when needed, and easier access for users. An added advantage of this type of sanitary unit is the possibility of an assistant of either gender assisting the person with a disability. Figure 4 shows the smallest dimensions for an independent universal sanitary unit.

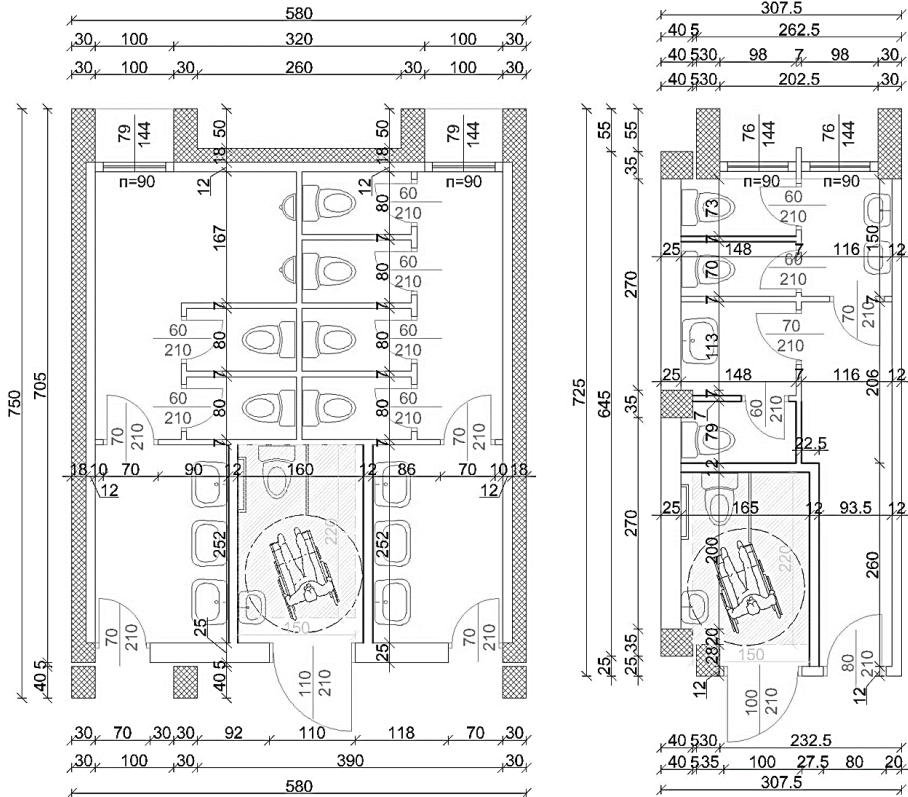
Figure 4

Unisex wheelchair-accessible toilet with corner WC (The Building regulations 2010, 2021)



According to the smallest prescribed dimensions for the access of persons with disabilities in sanitary units, Figure 5 shows a possible adaptation in the analyzed educational facility. The adaptation was made with minimal construction interventions on the two types of sanitary units that exist in the facility. With this modification of the space, an added sanitary unit is obtained, which functions as an independent unit within the area already used for that purpose. With this model, a separate sanitary unit is obtained with a direct entrance from the horizontal communication.

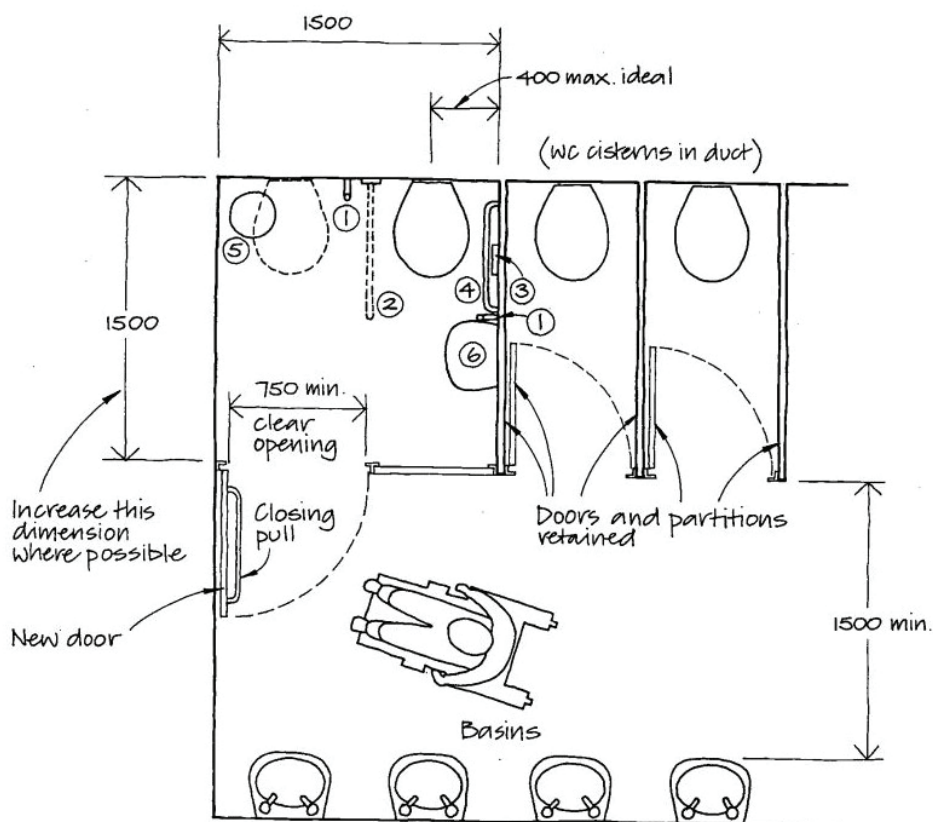
Adaptations to provide an independent sanitary unit for people with disabilities



The second way of adapting existing sanitary facilities to ensure unobstructed access for persons with disabilities is through the design of enlarged units following separate sanitary units by gender. In this case, people have more limited opportunities for manipulation in the space compared to an independent universal sanitary unit, and the advantage is that there is no division and feeling of discrimination, but equality and unity of all users are ensured. The advantage of this type of adaptation is that it enables persons with disabilities to feel equal in the environment in which they are found, while not reducing the possibilities of persons with normal physical abilities using the same. Figure 6 shows the smallest dimensions of a sanitary unit accessible to persons with disabilities as part of common sanitary units divided by gender.

Figure 6

Minimum adaptation requirements to existing WC compartments for wheelchair access
(Wood, 1999)



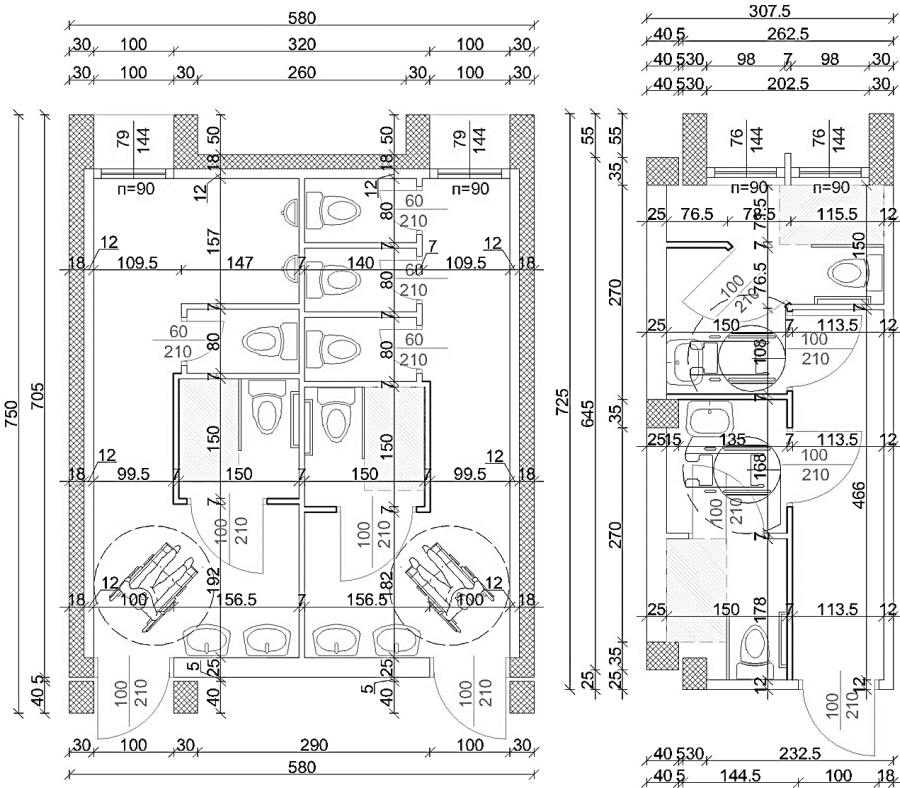
Minimum adaptation requirements to existing
WC compartments for wheelchair access

According to the smallest prescribed dimensions for providing an accessible sanitary unit in the assembly of several grouped sanitary units, an adaptation of the existing ones was made. Figure 7 shows a possible adaptation in the analyzed educational facility, where with the modification of the space, the number of sanitary units is the same, as well as in the existing condition, and at the same time, a sanitary unit accessible to persons with disabilities is provided. To realize this adaptation, it is necessary to increase the entrance parties to make the movement and manipulation easier for persons with disabilities in that part. This model of

adaptation allows people with reduced mobility to feel belonging in the built environment without reducing the comfort of all other users.

Figure 7

Adaptations to provide an accessible sanitary unit for people with disabilities in common units



Through this design analysis, two models of sanitary nodes have been made that allow access for people with disabilities, which solves one of the series of problems in the built environment for independent movement and manipulation in space. These two adaptations are following the applicable legal norms for the design of educational facilities and satisfy the number of sanitary units needed for this facility. From that aspect, the possibility of adaptations is limited and reduced to two possible models, which will following legal norms at the same time.

Conclusion

This paper gives an insight into the possibilities for adaptation of sanitary units in existing schools, designed and built in different periods of time, where different conditions for design and construction applied. Following the problems of implementation of inclusive education from the architectural point of view, this solves one problem: enabling normal conditions for the stay of persons with disabilities in schools. Although the space provides different variants and possibilities, the adaptations must satisfy the design norms and be an economically justified solution.

From the analysis of the selected sanitary nodes in the school "Tosho Arsov" Shtip, advantages and disadvantages were perceived in the three possible models of variation. The existing model offers sanitary units that do not provide accessibility for people with disabilities either with the entrance parties or in the units themselves.

The first model of adaptation is the design of an independent universal unit adapted for use by both genders. Such a unit allows entry outside the already existing units and gives greater visibility and easier accessibility to persons with disabilities. The advantage is that the space allows independent manipulation in the unit itself and added help if the user needs help from another person of any gender.

The second model of adaptation is through the provision of an adapted sanitary unit within existing gender-grouped units. In this way, two sanitary units adapted for the access of persons with disabilities are provided, one for both genders. For this type of adaptation, it is necessary to increase the entrance space intended for use by all users and, thus, also by persons with disabilities. The advantage of this model is that by organizing the space in this way, a sanitary module is obtained for all users of the facility without a feeling of division and discrimination, which is one of the main goals for which inclusive education stands for, that is, the entire inclusive society.

Each of the proposed models cannot be chosen as good or bad, it is important to state that adaptations are possible, and according to the needs it should be chosen which model can best function in a given space.

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