The coefficient of water vapor permeability of plaster lime mortars is 14 – 16 % higher than that of cement compositions. For cement mortars the coefficient of water vapor permeability virtually remains unchanged and is within 0,095 – 0,1 mg/(m·h·Pa) and for lime mortars it is 0,11 – 0,12 mg/(m·h·Pa)).

The formation of denser structure solutions with the filling results in lower open porosity as compared to control compositions. Therefore, despite the higher density of experimental compositions with a filler the indicators of factor conductivity are 11 – 15 % lower than those of the control compositions. Wherein the thermal resistance is increases by 15 – 25 %.

Thus, the heat engineering characteristics of cement and lime mortars containing the filler provide the necessary parameters for dressing both the exterior and the interior of buildings.

While determining the degree of adhesion of mortars containing the filler it was found that by using them as a base for ceramic bricks and concrete blocks, heavy fracture occurred within the solution, i.e. it bore a cohesive character. Despite the high surface roughness of gas silicate blocks destruction generally has an adhesive nature, with the partial destruction of the samples observed on the rough surface structure of silicate units. Adhesion strength to the surface of test solutions is 33 – 42 % higher than that of the control formulations and amounts to 0,3 – 0,59 MPa.

The results of the studies of adhesion of the filler-containing plastering mortar showed that in the control samples the degradation, regardless of the material of the base, occurred on the boundary between the mortar and the base whereas the contact surface of the solution remained virtually intact. The samples of lime mortars with the filler were destroyed within the structure of the solutions The adhesion strength of the test compositions reached 0,23 – 0,29 MPa which is 21 – 38 % higher than that of the solution with lime.

Research efforts reveal that the optimum filler for plastering cement mortars is that with the maximum size of particles amounting to 80 microns and the best share of it is 60 – 100% of the estimated mass of lime The durability strength of solutions with the filler within 7 days exceeds that of cement-lime mixtures by 14 – 17 %.

Optimum lime consumption reduction for plastering lime mixtures is 40 – 50 % with the introduction of the filler to an amount of 80 % of the replaced mass of lime. Water-retaining and peel ability remain at the level of the control data, whereas the strength of the filled mortars exceeds the strength of the lime composition by 60 % within 7 days and by 15 % within 28 days

The presence of the filler in cement plaster formulations can increase the viability of the mortars by 1,5 – 2 times which makes it possible to reduce the supply of the amount of the mortar to the construction sites thus decreasing labour intense and transport expenses. Cement plasters with the filler have a lower water absorption and lower strength drop in water-saturated state by 20 – 25 % compared to the cement-lime mortar which contributes to frost resistance increase by 15 % and ensures compliance with STB 1307 requirements.

Adhesion plaster cement and lime mortars filled more than 30 – 35 % of the performance of control formulations, which presumably would reduce the possibility of peeling plaster layer from the bottom in the operation of buildings in the event of exposure.

UDC 711.04

DESIGN FOR SPECIAL POPULATIONS

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There is a small number of people that deviate from the healthy norm in society due to stages in human development, injury, traumas, congenital disease or genetic abnormalities. The design for special groups is created for these groups of people.

For many years, the needs of people with disabilities have been constantly ignored. Creation of necessary conditions for such people just was not considered important or essential.

But now, the design of interiors and buildings for the disabled has become of a different character. Design for people with special needs has become a standard component in the construction.

Nowadays people with disabilities can get into almost any office buildings, dwelling houses, shopping centres or cafes. Such opportunity has appeared through the creation of a special barrier-free environment.

Barrier-free environment or universal design allows all people, including older people and people with disabilities to move in the public space without anyone's help. It is an opportunity for people with disabilities to engage in social, professional and cultural spheres and sport life of the country, obtain decent education and qualified job and have a rich and full life [3].

Basic principles of the universal design are equality, respect towards each other's peculiarities and functionality.

A barrier-free environment is a space that allows free and safe movement, function and access for all, regardless of age, sex or condition. A space of services that can be accessed by all, without obstacles, with dignity and with as much independence as possible. The environment means buildings, roads, parks, gardens and other places, services, modes of transportation, products of daily use, etc. There is a popular belief that a ramp and an elevator lift are all that is needed to make a built space barrier-free [4].

It must be clearly understood that barrier–free goes far beyond just a ramp and has many other necessary aspects. These range from passage widths of doors to flooring surfaces, from counter heights to door handles and railings, from signage and auditory signals to tactile guides.

On the face of it, it is only persons with disabilities for whom barriers become major obstacles. However, it is necessary to realize that every person, at some stage of life, faces barriers. A small child, an elderly or infirm person, a pregnant lady, the temporarily disabled, all are vulnerable to barriers. Therefore, the list of people affected by barriers is as follows:

- Wheelchair users
- People with limited walking/ movement abilities
- People with visual impairment or low vision
- People with hearing impairment
- Elderly and infirm persons
- Pregnant ladies
- Children
- People with temporary disabilities [1].

A barrier-free environment is a basic right of all. It is not a matter of choice or option. Ensuring access is a basic social necessity benefiting everybody. Not allowing a person equal opportunities and participation is an infringement on his or her rights as a citizen of this country.

In January 1992, the American Disabilities Act of 1990 (the ADA) became law. This landmark civil rights legislation represents one of the most significant steps in eliminating widespread discrimination caused by the imposition of barriers restricting persons with disabilities.

People with distinctive but similar design needs constitute special population. This group include persons with limited motion, hearing, or vision, as well as the elderly who may have some form of impairment in one or more of these areas. For such people, it is necessary to create a special interior [2].

The minimum clear passage width for a single wheelchair is 900 mm continuously. An accessible route should be 1200 mm wide to allow both a wheelchair and a walking person except where extra space is required at the doorways (Fig. 1).

The minimum passage width for two wheelchairs to pass side by side is 1500 mm. In the case of continuous stretch of corridor, the preferable width is 1800 mm.

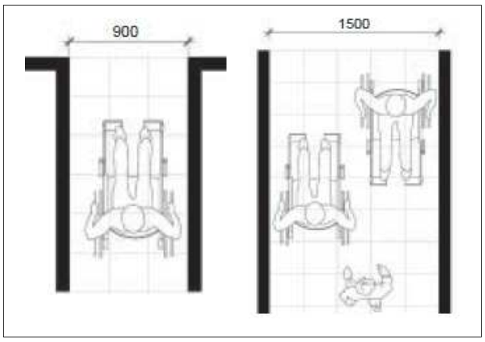

Fig. 1. Wheelchair Passage Width

Ground and floor surfaces along accessible route and in accessible spaces, including floors, ramps, stairs and curb ramps, should be level, stable, firm and slip-resistant. The surface should not be excessively textured and undulating.

Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp (Fig. 2) [5].

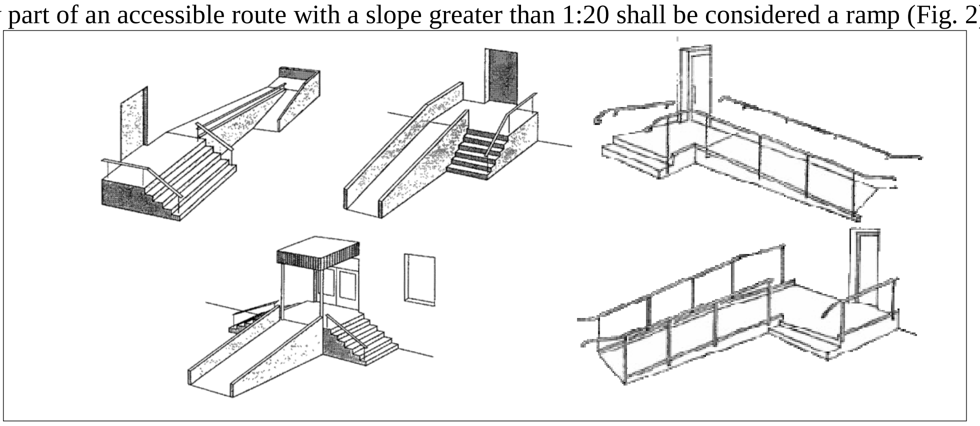

Fig. 2. Ramps

Handrail texture:

- Railings must meet all necessary dimension requirements (Fig. 3).
- Handrail should be slip-resistant.
- Railings should be painted a contrasting colour to the surroundings for the visually impaired.
- For emergency stairs or ramps a tactile strip at least 900 mm long should be applied to the top and bottom ends of the handrail to alert the visually impaired [5].

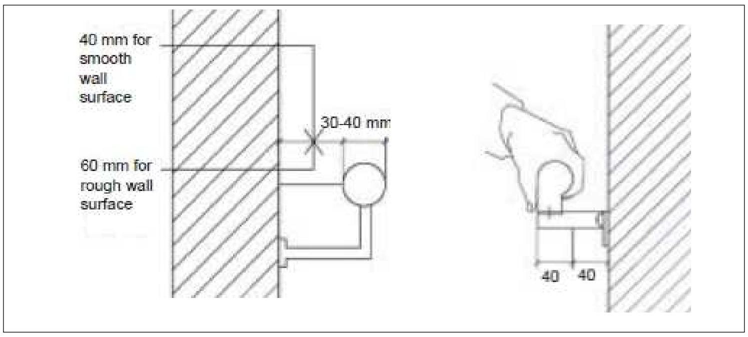

Fig. 3. Handrail

Any type of door, hinged, folded or sliding should have a minimum clear opening of 900 mm when fully open (Fig. 4).

Revolving doors and turnstiles should be supplemented with auxiliary side hung door not less than 900 mm clear. In the case of double-leaf doors, at least one door should have a minimum opening clearance of 900 mm.

Thresholds, if unavoidable, should not exceed 12mm and should have a bevelled sloped edge at 1:12 gradient.

Door hardware should be selected such as not to require fine finger control, grasping. Handle should be of a lever type rather than circular knob. Door hardware such as handles, latches, etc should be mounted between 900 mm and 1200 mm from the finished floor level and must enable the user to operate it by a single hand [1, 6].

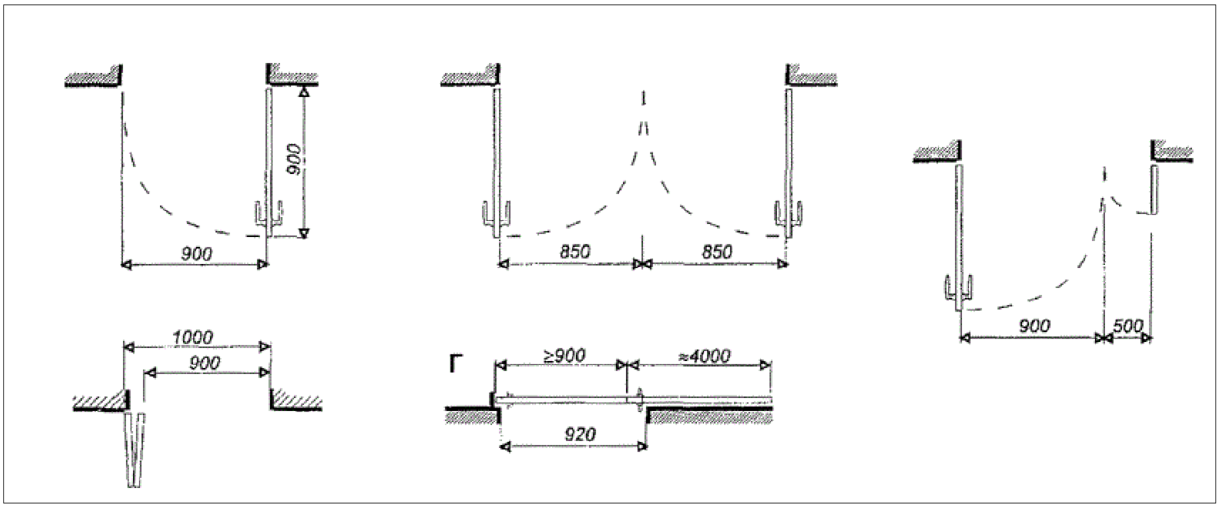

Fig. 4. Doors

The washroom should have a minimum internal dimension of 1750 mm × 1500 mm. Controls must be mounted between 900 mm and 1200 mm from the finished floor level.

Bathing space should have minimum dimensions of 1500 mm × 750 mm for usage by all types of the disabled, it should provide a 900mm horizontal grab bar and a 750mm vertical grab support at 900 mm from the finished floor level.

A shower head for the cubicle should be of the hand-held type with allocation for fixed use. The hose must be not less than 1500 mm long. Enclosures made for the shower area and bathtubs should not interfere with the controls and must allow easy transfer space for the person on the wheelchair. Soap dishes must be recessed and placed on the same wall as the shower head at a height between 900 mm and 1200 mm from the finished floor level.

A toilet cubicle designed for a wheelchair user should be of internal dimensions not less than 1500 mm × 1500 mm [1].

A minimum clear space of 1500 mm dia. must be provided between the counter and the opposite wall to facilitate wheelchair turning.

Shelves should be such that they are not more than 500 mm deep and not more than 1200 mm high from finished floor level. There should be a minimum gap of 400 mm between the edge of the work-top and the lower edge of the upper shelves.

Thus, the barrier-free environment is designed to ensure that buildings and facilities accessible to people with disabilities such as the inability to walk, difficulty while walking, resting on crutches, blindness, speech defects, hearing or vision.

Providing the building with all the necessary requirements for persons with disabilities will provide an opportunity for everyone to participate in all spheres of society (social, sporting, economic, educational, entertainment, etc.).

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PERSPECTIVES OF USING ASH FROM THE COMBUSTION OF PEAT IN CIVIL ENGINEERING

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The article provides an overview of the composition and properties of ash waste from the burning of peat at power stations in Belarus. It also summarizes suggestions for the areas of peat ash use in the production of building materials. It is shown that peat ash can be used in the manufacture of ceramic products, products of autoclaved hardening and also for water-repellency of dry mixes.

According to the State program on the creation of energy sources based on local fuels the flow of ash waste is to increase up to 300 000 tons annually, amounting to nearly 10 % of the total quantity of municipal and industrial waste [1]. The most widely spread local fuel is peat, the share of which in the total quantity of fuel will have amounted to 4,3 % by 2020 [2]. The largest reserves of low ash and medium ash peat are concentrated in Vitebsk region – 46 % of all stocks of the Republic [3]. Due to its physical and chemical composition peat ash, as a raw material, can be used in different productions and, above all, in civil engineering.

The dependence of the chemical composition of ash or slag ash, as the products of the burning of peat, on the substances which they include is displayed in Table 1 [3].

Table 1 – Averaged chemical composition of the ash and slag ash

SiO_2	AI_2O3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	TiO_2	P_2O_5	SO_3	ПППП
41-65	6-10	8-17	12-28	0,5-0,8	1,1-1,7	0,5-0,7	0,3-0,5	0,4-2,0	0,06-1,4	0,01-6,0

It was found out [4] that peat ashes consist mainly of amorphized by firing clay material and quartz grains, hardly altered by firing. The crystalline phase is represented mainly by quartz; besides, there is calcium oxide, dicalcium silicate, hematite, feldspar, minerals of the melklit group and presumably pyaticalcium trihaluminat.

A phasal chemical analysis of peat ashes, by means of the technique developed by S.M. Royakom, E.I. Nagerovoy and G.G. Kornienko [5], showed that the major part of calcium oxide in the ash is present in the form of silicates and calcium aluminates, these compounds are easily hydrated.

The correlation of the components of ash determines its activity and astringent properties. The main criterion for determining the binding propertie s of ash is the presence of free calcium and magnesium oxides. The major characteristics of the chemical composition of ashes are the module of the basis M0, which is the correlation between mass fractions of the major oxides and the total content of acidic oxides, and the silicate module MC, which displays the ratio of reactive