



INFLUENCE OF REGULATORY REQUIREMENTS ON ARCHITECTURAL AND PLANNING MODERNIZATION OF SCHOOLS.

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Abstract: *to formulate principles and identify methods of architectural and planning modernization of school buildings and give scientifically grounded recommendations for their design, based on modern requirements for the organization of the educational process.- - to analyze the education system, to determine the time stages of school construction, to study the current state of the theory and practice of school construction abroad.*

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Modern requirements for school institutions are a set of recommendations and regulations aimed at the implementation of educational activities. The compliance of a school building with the standards for the conditions of the educational process is fundamental in design and modernization.

The requirements affecting certain aspects of school construction can be presented in the following main directions.



1. Concerning the process and its participants - social, expressing the requirements of society and the state to the quality of educational services provided and the level of educational training of students. This group of requirements is formed under the influence of social and economic needs and is regulated by programmatic state and regional documents.
2. Regarding the safety and health of students - sanitary and hygienic, determining the optimal parameters of the learning environment (school network, school building, premises) in terms of medical recommendations, taking into account age characteristics; fire-fighting, which determine the safety parameters of the learning environment.
3. With regard to the architectural characteristics of the school building - urban planning, which determine the basic principles of building a network of educational institutions in conjunction with urban planning conditions; architectural and typological, defining the typological characteristics of educational institutions; constructive, which determine the choice of the constructive scheme [3].

The set of these requirements is set out in the main current regulatory documents [2, 4, 5, 6, 7,].

A comprehensive study of the characteristics and requirements for the construction and operation of school buildings in a temporary context allows us to talk about their inconstancy, and, accordingly, the impact on the architectural, planning and functional structure of the school.

The authors of many scientific works analyzed the requirements for the design and construction of school buildings, as a result of which the main ones were identified, which include social and pedagogical, urban planning and sanitary and hygienic [9, 10, 11]. Taken together, these requirements form the typology of school buildings in terms of purpose, capacity and organizational and pedagogical structure. The requirements for the organization of the



educational process and the formation of the architecture of school buildings can be divided into requirements for the organization of the school network, the school site, the school building and its individual planning elements.

Consequently, during modernization, the possibility of promptly changing the architectural and typological characteristics of school buildings, depending on the organizational and pedagogical structure, should be taken into account.

So, for example, in conditions of a shallow, dense settlement structure with a large number of gravitating population, in conditions of low demographic indicators, vertical interaction of schools is applicable. In this connection, it will be necessary: to change the organizational structure of functioning schools in gravitating settlements; change the type of school from secondary to primary with the introduction of additional functions; to form the composition of the premises of secondary and basic schools based on the need to organize leisure activities and profile training of students.

For the city, it will be relevant to use horizontal interaction between secondary schools, taking into account the distribution of general school functions in relation to the general infrastructure of the city. For example, strengthening the sports and health-improving function of the school, by organizing additional premises (swimming pool, sports sections), provided there is no out-of-school sports complex in the city area. In large villages where the school operates in the mode of serving its own population, the formation of the composition of the premises is based on the possibility of implementing special educational programs, as well as increasing the functional load on general school premises through the use of planning blocks for various purposes. Thus, the requirements for the formation of the organizational and pedagogical structure of schools in the republic, in conjunction with the modern requirements of society for the education process, will require the development and addition of the current typology of schools, in particular, in rural areas:



primary schools with preschool classes with a full-time schedule; main schools with pre-profile training in agrotechnical orientation and develop rural secondary schools through the introduction of additional functions.

It is customary to divide the enlarged functional zones of a school building into educational and general school, consisting of functional planning elements (groups of rooms), on the interposition and interpretation of which the functioning of the building as a whole depends.

The composition of the premises of the primary school in the existing buildings does not provide for the placement of a playroom, a sleeping room and an extended day room, as well as premises for preparatory classes for children of six years of age. Modern requirements recommend dividing the group of elementary school classrooms into two zones: the first is the premises related to first grade students, which include - bedroom-playroom, recreation of the hall type, which can be combined with the game and the class of the extended area, taking into account the organization of group lessons; the second - premises for students in grades 2-4, which includes classrooms with the possibility of organizing group and individual lessons, a versatile room that can be used for after-school and pre-school training, a work and visual arts room designed to be used by all primary school students.

Foreign language classrooms in the structure of the school building should be located accessible to primary school students in connection with the introduction of learning a foreign language from the second grade and learning the second state language from the first grade, which requires an increase in the number of classrooms designed for half of the study group - 12 people.

It has been established that the premises for workshops in natural sciences (chemistry, physics, biology) in school buildings were not initially provided. The norms provide for the desirable grouping of specialized classrooms with equipped laboratory assistants, designed for half a training group of 12 students.



An analysis of the data on the composition of school premises revealed a



significant shortage of specially equipped classrooms, in such disciplines as



music, drawing, fine arts, health and safety - 60%. According to regulatory



documents, such rooms can be included in the group of premises for aesthetic



and technical education, the creative development of students. It is advisable to



place the office of the basics of life safety in a group of premises for labor training or sports and recreation [6, 7,].

Analysis of foreign experience volume-spatial solutions of school buildings

- development from the center
- rigid functional separation

SIDE STRUCTURE (block - sectional)

School project for 600 students
USA, 2006

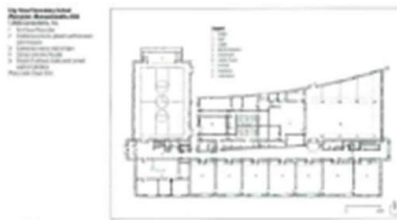
High school
Germany, 2010

School project for 800 students
USA, 1997



COMPACT CENTRALIZED STRUCTURE

- compactness
- pronounced central communication





General school premises include a gym, library, assembly hall, school canteen, and aesthetic and technical creativity spaces, as well as recreational spaces. Assembly halls, since most schools have a combined assembly hall with a dining room, or do not have it at all, in particular, in atypical, adapted projects of school buildings in rural areas. The average area of the assembly hall in our schools is 170 m², and, as a rule, does not have the necessary accompanying premises. The available assembly halls in urban schools provide only one third of the standardized 60% of students, and in most cases the assembly hall does not have the necessary auxiliary premises. Based on modern recommendations, it will be relevant to expand the functions of the assembly hall by combining it with a lecture hall equipped with a screen.

It is important to design a block of sports premises with the possibility of its autonomous use by the population outside of school hours.

Libraries in existing schools, as a rule, were originally designed only for storing and lending literature; there is no reading area. According to modern requirements, in the context of the widespread use of technical teaching aids, computerization of the educational process, the library acquires particular importance in the structure of the school and should additionally include a technical center with an area of 72 m², thus it is transformed into an information and technical center. Such a center provides for the organization of video and media libraries, a computer work area, a dedicated reading area and can be interconnected with a methodological office and a room for teachers' rest. The distribution of the area of the information and technical center can be represented as follows: 50% - places for individual lessons, 25% - for group work, 25% - for a recreation area [6].

The provision of dining rooms in rural schools is significantly lower than in urban ones. Considering the fact that a canteen is necessary when a school



building has a capacity of over 100 students, and the average school capacity in many large villages is higher than this value, a shortage of canteens can be stated in 25% of all schools. According to the norms, the kitchen block of the school dining room can be solved in two versions: with cooking on raw materials and on semi-finished products of the basic enterprises that provide school canteens. Thus, in small rural schools, a kitchen unit should be calculated based on the conditions for servicing it by a food factory, due to the supply of semi-finished products. For city schools and rural full-time schools, the best option would be to organize a developed group of premises for a kitchen block with cooking using raw materials.

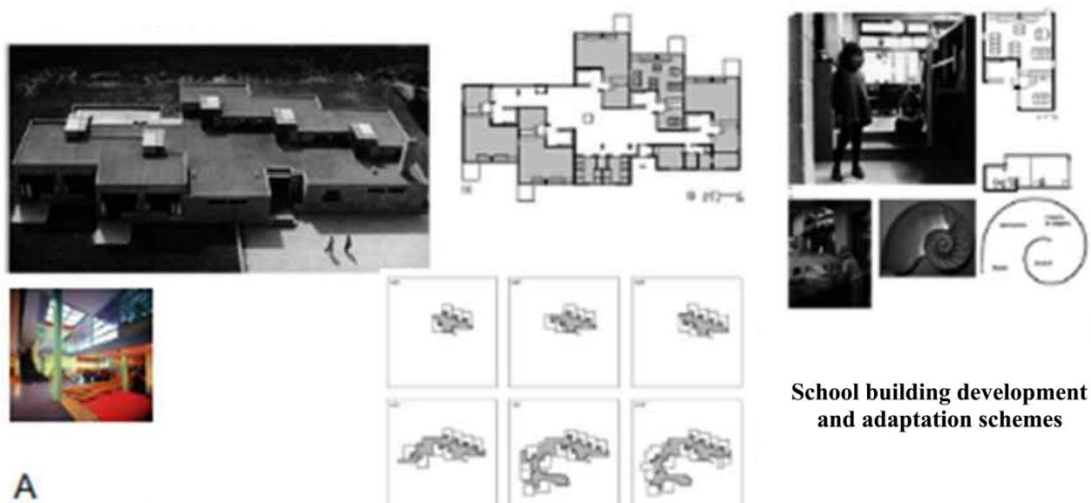
The provision of schools with doctors' offices is 50%, mainly in urban schools. The average area of medical offices in urban schools is close to the standard value - 21 m². It is possible to solve the problem of the lack of doctors' offices in rural schools through the interschool interaction of a group of schools. In this connection, it will be necessary to use transport provided with the necessary medical equipment - a mobile medical office. Premises for aesthetic and technical education of students in our schools are absent or are adapted and have insufficient material and technical equipment. Requirements for increasing the educational role of art and the technical development of students dictates the need to organize a developed group of such premises. In a secondary school, according to the minimum program, it is enough to have one universal room for aesthetic and technical education, an expanded composition of premises is accepted for schools with specialized training, lyceums and gymnasiums. In rural schools, the organization of conditions for aesthetic and technical development is possible through the use of transformation techniques in hall-type recreation.

Recreation spaces in schools are mainly transit spaces, the width of which is no more than 3 m. In modern schools, recreation plays an important



communication and communicative role, is the main link, a buffer between functional areas and can carry a certain additional load: horizontal communication - a place of short-term rest, information field; impassable recreation - for each educational, general school or age section; organization of a general school space on the basis of an enlarged recreation - a forum; place of

Formation of school buildings based on modular structures



active recreation; the lobby in front of the halls is a storage area; reserve for additional functional load, for example, in small rural schools. Modern standards provide for the design of recreational hall-type spaces with the possible use of upper and upper side lighting. The estimated standard of recreation for 1 student varies within 1.5-2.0 m².

The school's land plot is an integral part of the educational process, intended for physical culture and health improvement classes, work and recreation of students. The distinctive characteristics of the school site in urban and rural areas may influence the further modernization of school buildings. According to the norms, in rural settlements, a centralized transportation of students should be provided, in connection with which, it becomes necessary to place garages on the school site.



Ensuring the effective use of the school's land requires taking into account the connection between the functional areas of the building and certain areas of the school area [6]. The block of sports premises of the school building is located near the sports core on the site; the training and experimental zone, as a rule, is close to the economic zone, which has a direct connection with the premises of the dining room; and recreation areas are differentiated taking into account the age characteristics of students, with the possibility of dividing them into quiet and active zones. The school site depends on the general organizational and pedagogical structure of the school building, is based on the principles of dividing the types of activities, taking into account the pedagogical regime and hygienic requirements.

Modern standards provide a number of recommendations for the functional-planning and constructive-spatial solution of the school building, which determine the basic scheme of the interaction of school premises.

- a group of general school premises, in the conditions of its use by students and adults during extracurricular hours, it is important to form independently from the study group of premises;

- general school recreation (school forum) can be arranged in such a way that it serves as a link between the general school and educational areas and at the same time is the core of the spatial composition of the building;

- to achieve flexibility in the spatial solution of a modern school, it is characteristic to allocate groups of premises into functional blocks;

- educational blocks are formed on the basis of a single structural-spatial module 18x18 m with hall recreation, which makes it possible to develop a fairly diverse compositional solutions for schools and reduces the number of standard sizes of prefabricated structural elements;

- blocks of educational and general school premises can be used for extension to existing school buildings.



The block-sectional planning scheme is recognized as optimal by many specialists in the field of school construction, since it provides the possibility of forming flexible functional zoning of premises vertically and horizontally, stepwise construction and differentiation of students, and also allows the use of a system of an enlarged structural module.

The design requirements for school buildings depend on the building materials used and the dimensions of the individual structures of the enclosing elements. Several options for constructive solutions typical for the construction of schools should be highlighted: with brick and large-block load-bearing walls and panel ceilings, with self-supporting lightweight walls, with an internal reinforced concrete frame and panel ceilings. In modern construction of school buildings, preference is given to a frame structural system with monolithic ceilings, which allows not to restrict the choice of the shape of the premises, allows you to flexibly and quickly respond to internal changes in the educational environment if necessary, provides a universal approach to design [1, 8].

Another important requirement for modern school buildings is its typological universality, which is dictated by the variety of types of school institutions, the variety of conditions for building a school network and the conditions for modernizing schools in the existing development. The implementation of the requirements for such versatility of the school building is carried out due to the composition of the premises, which is determined based on the possible increase in the number of parallels of the senior classes, requiring an expanded nomenclature of specialized classrooms, as well as due to the structure of the building, built on the principle of autonomous educational block sections.

A comparative analysis of the regulatory requirements for the composition and areas of premises in school buildings, as well as the possibilities of forming



a functional planning structure, is necessary and allows you to give an objective assessment of the existing fund of school buildings, select methods and techniques for its modernization.

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