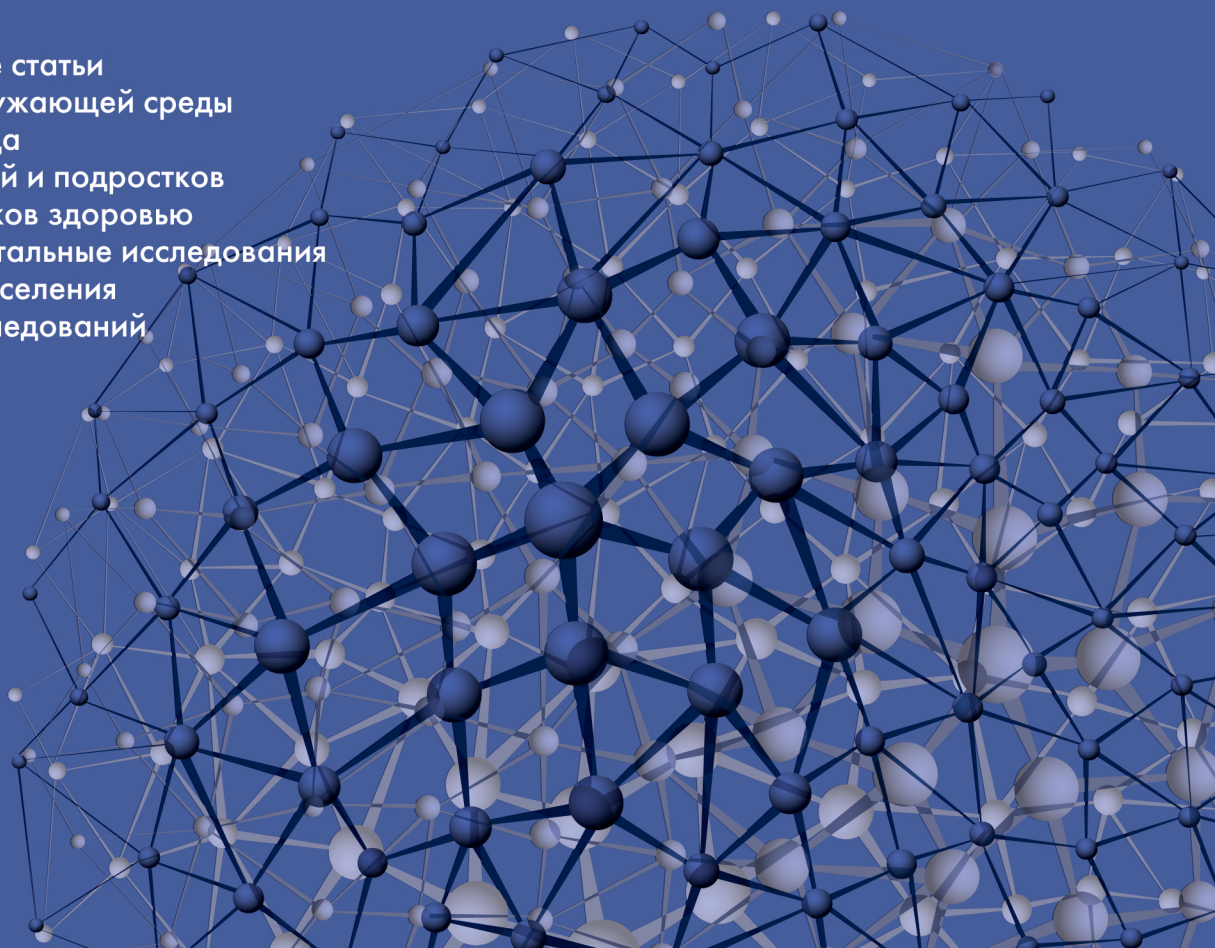


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Hygienic requirements for the construction and operation of sports facilities in the Russian Federation and Italy. Review manuscript

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This review manuscript presents actual information on sports facilities, their design and the impact they may have on human health. Based on the current sanitary and hygienic norms and regulations the authors describe types of sports facilities, give their classification depending on the designated use, point out the peculiarities of sports facilities arrangement in Italy and Russia. Special attention is paid to the necessity to meet the hygienic requirements when constructing and maintaining sports facilities. The paper highlights the hygienic requirements for all sports facilities, regardless of their type, to be standardized by the following components: location of sports facilities within the boundaries of a settlement; orientation of sports facilities; transport accessibility; layout; state of the environment (air, water, soil); nature of landscaping and the area of green spaces; noise intensity level; microclimate of sports facilities (relative temperature and humidity, air velocity). Hygienic requirements for indoor sports facilities are given on the example of gyms that appear to be the most common structures. Particular attention is paid to the requirements for indoor microclimate and lighting. Requirements for the gym equipment and inventory are considered to comply with certain standards and serviceability. Based on the literature data, the manuscript emphasizes the need for sports facilities to meet sanitary and hygienic requirements and standards, since the health effect of physical exercises and sports depends on their sanitary condition. The unified requirement in different countries is to conduct the routine sanitary inspections of all the premises of the sports facilities after putting a sports facility into operation following detailed internal rules and regulations.

К е у о r d s : review; hygienic requirements; sports facilities; sports; hygiene; health.

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Капассо Л.¹, Д'Алессандро Д.², Попов В.И.³, Либина И.И.³, Торубарова И.И.³

Гигиенические требования к строительству и эксплуатации спортивных сооружений в Российской Федерации и Италии. Обзорная статья

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В данной обзорной статье представлена актуальная информация о спортивных сооружениях, их проектировании и влиянии, которое они могут оказать на здоровье человека. На основании действующих санитарно-гигиенических норм и правил авторы дают описание типов спортивных сооружений, их классификацию в зависимости от пред-назначенного использования, указывают на особенности устройства спортивных сооружений в Италии и России. Особое внимание обращается на необходимость соблюдения гигиенических требований при строительстве и

обслуживании спортивных сооружений. Гигиенические требования ко всем спортивным сооружениям, независимо от их типа, нормируют следующие элементы: место расположения спортивных сооружений в черте населённого пункта; ориентацию спортивных сооружений; транспортную доступность; планировку; состояние окружающей среды (воздуха, воды, почвы); характер озеленения и площадь зелёных насаждений; уровень интенсивности шума; микроклимат спортивных сооружений (относительная температура и влажность, скорость движения воздуха). На примере наиболее распространённых сооружений – спортивных залов – рассмотрены гигиенические требования к крытым спортивным сооружениям. Особое внимание уделено требованиям к микроклимату помещений и освещённости. Требования к оборудованию и инвентарю спортивных залов рассмотрены с позиций необходимости соответствия определённым стандартам и исправности. В статье на основании данных литературы подчёркнута необходимость соответствия спортивных сооружений санитарно-гигиеническим требованиям и нормам, поскольку от их санитарного состояния зависит оздоровительный эффект занятий физическими упражнениями и спортом. Единым в разных странах требованием после сдачи спортивного сооружения в эксплуатацию является проведение текущего санитарного надзора всех помещений спортивного объекта с подробными правилами внутреннего распорядка.

К л ю ч е в ы е с л о в а : обзор; гигиенические требования; спортивные сооружения; спорт; гигиена; здоровье.

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Introduction

Physical culture is one of the main factors, that actively contribute to the preservation, strengthening and development of public health [1].

It is impossible for a person to exercise without close interaction with the environment, and the factors that determine its formation, both directly and indirectly, have an impact on the body of athletes and their results [2, 3].

Unfavorable conditions of the sports environment can result in development of abnormalities of the main body system parameters, injuries, disability, the appearance of long-term adverse effects and even the development of chronic diseases [4].

Sports facility means a place designed and equipped primarily for observation of sports, leisure time activities and other customary and usual recreational activities, which provides opportunities for mass health-improving physical education, educational work and sporting events.

Sports facilities are divided into basic, auxiliary and spectator facilities. Basic facilities are designed for doing sports, auxiliary ones are for servicing people doing sports and competitors. Spectator facilities include stands, pavilions, foyers, canteens and bathrooms¹.

Depending on the functional purpose there are separate (for one kind of sports) and complex structures (several geographically united facilities).

Discussion

In Italy 17.7 million people (approx. 30% of the population) declare to practice one or more sports in their free time, and 16.3 million are those who practice some physical activity [5, 6].

Gyms are the most frequented sport facilities and represent a peculiar indoor environment because of their building characteristics, but also because of the activities that are performed inside them [6-8]. Among the several health threats that might be detected in gyms, some are common to all indoor environments [9, 10], while others are specific; considering that gyms are frequently located in ground floors or semi-basements, radon, temperature and humidity, moulds and inadequate ventilation should be included [11]. Therefore, proper maintenance of air conditioning systems and appropriate management of common structures and facilities for the users need to be stressed [8, 10].

In Italy 3842 gyms are currently active on national scale and they are in continuous growth [6, 12], and only a few of them are affiliated with federations belonging to the Italian Olympic Committee (CONI), and therefore regulated by this institution, also for what concerns hygienic requirements.

Actually, if complexes or sports facilities are affiliated to CONI through a sport federation or a sport promotion organization, they must comply not only to national rules, but also to CONI technical regulation "CONI Standards for Sports Facilities"².

The safety rules for the construction of sports facilities are part of the Ministerial Decree (D.M.) 18/03/1996, as further modified by D.M. 06/06/2005³, both delivered by the Ministry of Interior.

National legislation about building hygiene does not take gyms into specific account [5]. The Ministerial Decrees 18/03/1996 and 06/06/2005 mainly deal with safety prescriptions, but they remand to the CONI standards (Table 1). These standards also contain specific

Table 1

Requirements according to the Italian Olympic Committee (CONI) modified by Capasso L. et al. 2015 [5]

| Spaces | Ceiling height | Hygienic requirements | Lighting |
|------------------------|--|---|---|
| 4m ² / user | Mean height 3 m, minimum height 2,7 m. | Air exchange can be guaranteed using windows, mechanical systems or mixed systems. Rooms with high humidity (pool, showers, overcrowded spaces) must be equipped to avoid the formation of moisture. | Different depending on the kind of space. At least 200 lux for areas where activities are performed. |

² Linee-guida per la tutela e la promozione della salute negli ambienti confinati" (G.U. 27 novembre 2001, n. 276, suppl. ord.

³ Decreto Ministero dell'Interno 18/03/1996 "Norme di sicurezza per la costruzione e l'esercizio degli impianti sportivi". (In Italian)

Decreto Ministero dell'Interno 06/06/2005 "Modalità per l'installazione di sistemi di videosorveglianza negli impianti sportivi di capienza superiore alle diecimila unità, in occasione di competizioni sportive riguardanti il gioco del calcio." (In Italian)

¹ Act N 172 of the Ministry of Sports of the Russian Federation, issued 25.02.2016 « On approval of the classifier of sports facilities [Ob utverzhdenii klassifikatora ob"ektov sporta]». (In Russian)

Table 2

Attachment to the Italian Olympic Committee (CONI) standards regarding thermo-hygrometric parameters, modified by Capasso et al. 2015 [5]

| Type | Temperature, °C | Humidity, % | Illumination, lux | Air exchanges, Vol/h | Air speed, m/s | Rooms |
|--------|-----------------|-------------|-------------------|----------------------|----------------|-------------|
| Indoor | 16-20 | 50 | * | ** | 0,15 | Activity |
| | 20-22 | 50 | 200 | ** | 0,15 | Preparatory |
| | 18-22 | 50 | 150 | 5 | 0,15 | Locker |
| | 22 | 70 | 80 | 8 | 0,15 | Shower |
| | 22 | 60 | 80 | 5-8 | 0,15 | Toilet |
| | 20 | 50 | 200 | 2,5 | 0,15 | First Aid |
| | 20 | 50 | 200 | 1,5 | 0,15 | Office |
| | 20 | 50 | 200 | 1 | 0,20 | Entrance |
| | 16 | 50 | 100 | 0,5-1 | 0,25 | Storage |
| | 20 | 50 | 150 | 0,5 | 0,20 | Others |

* Reported in Table B (they vary from 100 to 800 depending to audience size).

** At least 20m³/h/person for the public area; 30m³/h/person for athletes' area.

microclimatic prescriptions, in particular related to thermo-hygrometric parameters, reported in the attached Table (Table 2).

It is important to consider that regional government are also intitled to enact laws in the field of health. Currently only six regions (Basilicata, Calabria, Liguria, Marche, Toscana and Umbria)⁴ delivered specific regulations about hygienic and sanitary requirements of gyms [5]. These laws were issued between 1997 and 2013 and their contents are quite similar (Table 3) and do not substantially differ from technical guidelines provided by CONI.

In the Russian Federation currently there are more than 287,400 sports facilities (including 148,000 plane structures, 73,300 gyms, 5,800 swimming pools). New sports facilities are put into operation every year. They are subject to special hygienic requirements, and they must meet these requirements to provide optimal conditions for people involved in physical education and sports. These requirements are regulated by the relevant construction and sanitary norms and rules of the Ministry of Health, industry regulatory and methodological documents of the State Committee for Physical Culture, Sports and Tourism.

Obviously, to set forth the regulatory requirements in full for all types sports facilities is a difficult task. Therefore, codes of practice or separate requirements (approved regulatory documents) must be developed for each type of objects for design and construction that are parts of the Economic Register of Cost-Effective Design Documentation adopted on January 17, 2018 (Table 4).

The hygienic requirements for all sports facilities, regardless of their type, are standardized by the following elements: the location of sports facilities within the boundaries of a settlement; orientation of sports facilities; transport accessibility; layout; state of the environment (air, water, soil); the nature of landscaping and the area of green spaces; noise intensity level; microclimate of sports facilities (relative temperature and humidity, air velocity).

⁴ Basilicata: Legge Regionale n. 6 del 21/01/1997 "Disciplina dei centri di attività motorie" (In Italian)

Calabria: Regolamento Regionale n. 8 del 23/12/2011 "relativo alla Legge Regionale n. 28 del 22-11-2010 relativamente agli standards strutturali e di gestione per lo svolgimento delle pratiche sportive agonistiche e non, ai contributi regionali per attività sportive, manifestazioni sportive e relativamente alla Commissione regionale per lo sport." (In Italian)

Liguria: Regolamento Regionale n. 4 del 11/02/2003 come modificato dal Regolamento Regionale n. 1 del 21-03-2007 "Requisiti tecnici, igienico-sanitari e di sicurezza degli impianti e delle attrezzature per l'esercizio di attività ginniche, di muscolazione, di formazione fisica e di attività motorie per la terza età, ai sensi dell'articolo 29 della legge regionale 5 febbraio 2002, n. 6" (norme per lo sviluppo degli impianti sportivi e delle attività sportive e fisico-motorie). (In Italian)

Marche: Regolamento Regionale n. 4 del 07/08/2013 "Disposizioni di attuazione della Legge Regionale 2 Aprile 2012, n. 5" (disposizioni regionali in materia di sport e tempo libero). (In Italian)

Toscana: Decreto del Presidente della Giunta Regionale n. 7/R del 13/02/2007 "Regolamento di attuazione della legge regionale 31 agosto 2000, n. 72" (Riordino delle funzioni e delle attività in materia di promozione della cultura e della pratica delle attività motorie). (In Italian)

Umbria: Regolamento Regionale n. 16 del 29-05-1998 "Norme di attuazione delle disposizioni recate dal titolo IV (Tutela della salute dei cittadini e regolamentazione degli impianti sportivi e delle attività fisiche non disciplinate dal C.O.N.I.) della legge regionale 4 luglio 1997, n. 21". (In Italian)

Selection of the place for siting sports facilities and places arranged to practice physical culture and sports, as well as projects for the expansion and reconstruction of existing sports facilities is a subject to agreement between the bodies and authorities and institutions of the sanitary and epidemiological service.

Siting sports facilities on the area designated for construction must meet the requirements of the Town Planning Code №190-F, 29.12.2004⁵.

Siting sports facilities in urban development and the dimensions of the plot of land should be taken in accordance with SP (Code of Conduct) 42.13330.2016 "Urban development. Urban and rural planning and development"; or with regional norms of urban design⁶.

The plot of land for the sports facility should be located in accordance with SP 2.1.2.3304-15 "Sanitary and epidemiological requirements for the placement, arrangement and maintenance of sports facilities"⁷.

The plot of land for sports facilities should be located outside of industrial facilities and factories, sanitary protection zones of industrial facilities and factories, the first zone of sanitary protection of water supply sources and drinking water supply systems, sanitary roadside-clear zones, parking lots, railway transport facilities, take-off and landing aircraft course lines in compliance with sanitary and epidemiological requirements and at distances that provide regulatory levels of electromagnetic radiation, noise, vibration, infrasound, ionizing radiation, the content of harmful substances in the air, established for the residential area.

The level of soil and air pollution⁸ should be taken into account when choosing a place for the construction of a sports facility in a settlement. When planning the location of sports facilities, it is necessary to take into account the data of the "wind rose" (mariner's card). Sports facilities should be located in areas with small slopes, on the southern slopes, protected from the prevailing winds, and if possible in places with a sufficient degree of landscaping: a natural green area or an open pond. These factors greatly improve the microclimatic conditions.

⁵ Town-Planning Code of the Russian Federation [Gradostroitelnyy kodeks Rossiyskoy Federatsii] 29.12.2004 N 190-FZ (reissued on 27.06.2019) (effective from 01.07.2019). (In Russian)

⁶ SP 332.1325800.2017. Sports facilities. Design rules [Sportivnye sooruzheniya. Pravila proektirovaniya]. 147pages. (In Russian)

⁷ Act No. 61 "On approval of SP 2.1.2.3304-15 "Sanitary and epidemiological requirements for the placement, construction and maintenance of sports facilities [Ob utverzhenii SP 2.1.2.3304-15 «Sanitarno-epidemiologicheskie trebovaniya k razmeshcheniyu, ustroystvu i soderzhaniyu ob'ektov sporta»" (together with "SP 2.1.2.3304-15. Sanitary epidemiological rules and regulations ...", September 28, 2015 (Registered in the Ministry of Justice of the Russian Federation on October 29, 2015 No. 39547).

⁸ SanPiN 2.1.7.1287-03 "Sanitary and epidemiological requirements for soil quality [Sanitarno-epidemiologicheskie trebovaniya k kachestvu pochvy]", approved by the Decree of the Chief State Sanitary Doctor of the Russian Federation of 04.17.2003 N 53 (registered with the Ministry of Justice of Russia 05.05.2003, registration N 4500), as amended by the resolution Chief State Sanitary Doctor of the Russian Federation of 04.25.2007 N 20 (registered by the Ministry of Justice of Russia on 05.06.2007, registration N 9598). (In Russian)

Table 3

Requirements in the different Italian Regions, from Capasso et al. 2015 [5]

| Region | Spaces | Ceiling height | Location | Hygienic requirements | Lighting |
|------------|--|---|---|--|---|
| Basilicata | 4 m ² /user (freestyle) 6 m ² /user (tools) | - 2.4 m for services rooms; - 3 m for rooms dedicated to activities for less than 50 users, - 3.5 for more than 50. (2.7 m for existing structures, installing a mechanical ventilation system) | Ground or semi-basement; (not lower than one floor underground or up-ground); Structure than can contain over 50 users must be at ground floor or have a direct exit to open spaces. | / | / |
| Calabria | 4 m ² /user | Mean height 3 m, minimum height 2,7 m. | / | Air exchange can be guaranteed using windows, MVS* or mixed systems; Rooms with high humidity (pool, showers, overcrowded spaces) must be equipped to avoid moisture | Different depending on the kind of space. ≥ 200 lux for areas where activities are performed |
| Liguria | ≥ 50/80 m ² *; ≥ 3m ² /user | ≥ 2,5 m | / | / | / |
| Marche | ≥100 m ² (total floor) - 3 m ² /user (freestyle); - 5 m ² /user (tools) | 2,70 m, 2,4 m for storage and toilets 2,40, reduced to 2,2 m for those structures already authorized. | / | / | / |
| Toscana | 4 m ² /user | / | / | 1/12 of floor area for activity rooms (if not possible, MVS* must be installed). For toilets and showers at least 1/8 of floor area (If not possible MVS* that ensure at least 5 vol/h of air exchange must be installed) | / |
| Umbria | Total floor area 100 m ² , 50 of who dedicated to activities; 3 m ² /user (freestyle) 5 m ² /user (tools) | 2,70 m for activities area, first aid, locker room, 2,4 m for other rooms | The structure cannot be located over the first underground floor and must have a direct exit outdoor; it may be placed over 12m only if emergency services can reach it. | Air exchange must comply with UNI 10339/1995; | / |

*MVS: mechanical ventilation systems.

The groundwater level should be at least 0.7 m below the planned surface of outdoor sports facilities. Sports facilities should have a belt of arboreal or shrubby windbreak and hedgerow plantations of different heights with a width of at least 10 m along the perimeter.

Land-plot layout of sports facilities should be designed according to the SP 118.13330-2012 "Public buildings and works", the updated edition of SNiP (construction code and regulations) 31-06-2009 (with Amendments N 1, 2) for ensuring the access and movement all client groups and their vehicles in various functional zones. Land-plot layout of the sports facility should provide the possibility of unhindered passage and free placement of special equipment of city services (emergency rescue, firefighters, etc.).

The territorial improvement of sports facilities must comply with SP 59.13330-2016 "Accessibility of buildings and structures for people with reduced mobility", updated version of SNiP 35-01-2001, SP 82.13330-2016 "Territories Improvement".

Area improvement should include a set of measures for engineering preparation for landscaping, paving, lighting, placement of small architectural forms and objects of monumental art, aimed at improving the functional, sanitary, environmental and aesthetic conditions of the territory.

In the process of designing and constructing sports facilities (stadiums, gyms and playgrounds) special attention should be paid

to lighting. External artificial lighting (SP 52.13330-2011) of the territory of the sports facility should not cause excessive lighting of the nearby residential buildings. Outdoor and indoor lighting should be designed to be controlled separately.

Table 4

Sports buildings and facilities

| Sector | Type of facility |
|---------------------------------|---|
| Sports buildings and facilities | Section 1. Sports complexes with an ice arena |
| | Section 2. Sports and recreational complexes |
| | Section 3. Sports complexes with swimming pools |
| | Section 4. Palaces of sports |
| | Section 5. Skating rinks |
| | Section 6. Stadiums |
| | Section 7. Separate and complex roofless structures |
| | Section 8. Separate and complex roof structures |
| | Section 9. Swimming pools |

In Russia, the norms of sports lighting are regulated by a number of reference documents, SNiP 23-05-2010 in particular, including SP 52.13330.2011, as well as SanPiN 2.2.1/2.1.1.2585-10 "Hygienic requirements for natural, artificial and combined lighting of residential and public buildings". These documents determine standards of illumination of indoor and outdoor sports facilities.

Sports facilities should be equipped with heating systems that provide temperature and humidity parameters of the air environment in accordance with the requirements of SP 2.1.2.3304-15, GOST 30494-2011, SP 60.13330-2012.

Temperature standards are defined depending on the nature of the work performed by a person involved in the activity. In sports activities, associated with higher heat production and the need to provide increased heat exchange, the temperature standard is set at a lower level compared to the standards of residential premises.

Ventilation and air conditioning systems should provide normal parameters of the microclimate and air environment of the premises in accordance with the requirements of SP 2.1.2.3304-15, GOST 30494-2011, SP 60.13330-12.

Sports facilities should be designed to have utility, drinking water, fire and hot water supply, sewerage and drains, which must be designed in accordance with SP 30.13330, SP 10.13130 and SP 2.1.2.3304-15.

Buildings of sports facilities should be equipped with systems of utility and drinking water supply, wastewater disposal and sewerage. Utility and drinking water should meet the hygienic requirements for water quality of centralized systems of drinking water supply according to SanPiN 2.1.4.1074-01 "Drinking water. Hygienic regulations of the water quality of centralized drinking water supply system. Quality control. Hygienic requirements for safety of hot water supply systems"⁹.

In the absence of centralized hot water supply, an autonomous hot water supply system should be provided with the installation of water heaters for medical premises, industrial premises of the dining room, showers, bathrooms, rooms for storing cleaning equipment.

The dimensions of planar sports facilities are set by the design task depending on the requirements of the sport and the level of the sporting event. Seats for spectators are recommended to be faced northward or eastward. For training grounds, seats for spectators are allowed to be organized differently, based on the design task¹⁰.

Sanitary protection zones should be organized to ensure the safety of the population and adequate living conditions from open planar sports facilities with fixed stands to residential building, its dimensions are determined according to the SanPiN 2.2.1/2.1.1.1200-03 "Sanitary protection zones and sanitary classification of facilities, structures and other objects".

In the absence of spectator seats, fences are installed along the border of the sports zone, including the safety zone of the planar sports facility.

Hygienic requirements for indoor sports facilities are considered on the example of the most common facilities – gyms.

When designing gyms, the requirements for ceiling height above the sports zone must be observed, beyond its borders, a gradual decrease in height is allowed, up to 3 m at least.

When designing universal gyms designated for a one-time sporting event in a joint sports area at several venues, throughput increases according to the number and purpose of these venues.

When placing several playgrounds for various sports in the gym, separation devices should be provided between them. Their design should be chosen considering the possibilities of placement in the gym, ease of operation and functional purpose of the partition: suspended, mechanical, electric, mesh, sound-absorbing, etc.

In multifunctional sports complexes, where gyms are separated by transformable partitions, and each gym must be directly connected with the locker rooms, it is allowed to organize a system for the gym separation with the help of the passage 2-1.2 m wide along the inner wall of the gym.

In the gyms for training sessions, the requirements for the dimensions of the safety zone must be observed.

Gyms can be located in special buildings or parts of public buildings. Gyms for gymnastics, weightlifting, athletics and football

should be located on the ground floor, and the gyms for athletics and football should be provided with the entry for vehicles. The platforms inside these facilities are installed on the ground, without linking them to the main structures of the building.

There are certain standards for the dimensions of gyms that provide the most effective implementation of the training process, as well as maintaining the necessary level of physical and chemical parameters of the air environment. The one-time capacity of the gym and its dimensions are determined based on the calculation of the area per one athlete in square meters.

Interior decoration has its hygienic importance. Surfaces in the gyms should be smooth, without protrusions, resistant to the impact of the ball and wet cleaning.

Creation of optimal microclimatic conditions in the gyms is of particular hygienic importance. According to SNiP 11-76-78 temperature standards for indoor sports facilities in accordance with are as follows: in the gyms with a capacity of more than 800 spectators – +18 °C in the cold period of the year at the relative humidity 40%-45%, and no more than +25 °C in the warm period of the year at a relative humidity 50%-55%; in the gyms with a capacity of 800 and less spectators – +18 °C in the cold period of the year and no more than 3°C above the estimated outside air temperature in the warm period of the year; in the gyms without seats for spectators – + 15 °C¹¹.

In enclosed spaces, both the chemical composition of air and its physical properties change. These changes are especially significant in the rooms where a person performs intensive muscular work. Exercise and indoor sports, especially when conducted by a group of 20-25 people, cause a significant deterioration in air quality.

To ensure the necessary air exchange, sports facilities are provided with a central supply and exhaust ventilation device designed to supply at least 80 m³/h of outside air per one athlete and 20 m³/h for one spectator. In emergency cases, decentralized artificial ventilation is arranged with the maximum use of ventilating the premises through transoms and vents.

Concentration of harmful substances in the air of sports facilities should not exceed hygienic standards for the atmospheric air of populated areas, according to GN (Hygienic Standards) 2.1.6.3492-17 "Maximum allowable concentrations (MAC) of pollutants in the air of urban and rural settlements"¹².

During the construction of sports facilities, all working rooms, both basic and auxiliary, should be located in the way to allow natural (sunlight) light to penetrate into them. Windows should be located not lower than 2 m above the floor. The best shape of the window is rectangular. The closer to the ceiling is an upper edge of a window, the better is the illumination of the room.

In gyms intended for sports games (including universal gyms), windows are not allowed in the end walls.

In gyms, the orientation of the side light openings to the cardinal points under one-sided lighting should be done to the southeast in the central and northern regions, and to the northeast in the southern regions. When arranging light openings on two or more sides, the wall with the largest area of light openings should be oriented to the southeast in the central, northern regions, and to the north in the southern regions.

For artificial lighting in gyms it is recommended to install reflected light sources or luminous strips and panels. Lighting devices should be equipped with protective fittings.

In the gyms for basketball, volleyball, tennis, football, handball, it is not allowed to place lamps on the end walls (with the exception of reflected lights). The level of minimum horizontal illumination of gyms, indoor skating rinks and indoor pools with stationary stands and a total capacity of more than 800 spectators should be taken equal 400 luxes.

When providing illumination of indoor sports facilities with incandescent lamps, it is allowed to reduce the level of illumination by one grade (except for lighting of shooting galleries, firing zones and targets in shooting ranges).

Equipment and inventory of gyms must be in good condition and meet certain standards. They should also meet a number of hygienic requirements, which is aimed at creating normal conditions

⁹ SanPiN 2.1.4.1074-01 "Drinking water. Hygienic regulations of the water quality of centralized drinking water supply system. Quality control. Hygienic requirements for safety of hot water supply systems" of 26.09.2001 (In Russian)

¹⁰ Open planar sports facilities [Otkrytye ploskostnyye fizkulturno-sportivnye sooruzheniya] SP 31-115-2006. 239 pages. (In Russian)

¹¹ SNiP 11-76-78. Construction norms and regulations. Sports facilities, design standards. - 89 p. (In Russian)

¹² On approval of hygienic requirements GN 2.1.6.3492-17 "Maximum permissible concentration (MPC) of pollutants in the air of urban and rural settlements [Predelno dopustimyye kontsentratsii (PDK) zagryaznyayushchih veshchestv v atmosfernom vozduhe gorodskikh i selskikh poseleniy]" (amend. 31.05.2018). (In Russian)

for the training process, preventing sports injuries, cleaning dust from contaminated air, etc. Sports equipment should correspond to the age-specific characteristics of those involved in sports.

During the design, construction and reconstruction of sports facilities, dressing rooms, showers, toilets are equipped taking into account the age-specific characteristics of those involved in sports.

Conclusion

Thus, sports facilities must comply with sanitary and hygienic requirements and standards, because health effect of exercise

and sports depends on sanitary conditions. The main difference between the two countries in this field is the lack of nationwide regulation in Italy. This is a major caveat in Public Health protection, and the Italian lawmakers should take action, in order to enhance an act relying on the most recent acquisitions of international scientific literature, as it happens in the Russian Federation.

After completion of the sports facility current sanitary inspection and supervision of all premises of the facility should be carried out regularly, at each sports facility internal regulations should be introduced.

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