

## Designing Unique Sports School Overlaps

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### **Annotation:**

This article provides information about unique sports school overlaps. In addition, the types of unique ceilings, materials used and requirements for them are presented.

**Keywords:** Design, ceilings, sports schools, unique, structures, concrete, metal, features.

**Introduction.** Designing sports school floors is a complex and multifaceted process that requires consideration of various factors: functional requirements, safety, ergonomics, acoustics and aesthetics. Unique floors are usually designed taking into account the specifics of sports facilities and often use the latest construction technologies and materials.

Many sports facilities, such as indoor stadiums, ice arenas, indoor riding arenas, volleyball and basketball courts, indoor tennis courts have a large area and exclude the presence of load-bearing supports inside the building. Large-span architecture has always occupied and continues to occupy a special place in world history. The construction of such large-scale objects has its own technical direction in design. And this direction has retained increased interest in the professional environment to this day. That is why large-span projects have become a characteristic feature of modern large cities. And, basically, these are public buildings, where the properties of such structures - both functional and aesthetic - have the opportunity to clearly demonstrate themselves.

**Main part.** In this article, we will consider the main aspects of designing such floors.

### 1. Functional requirements

The floors of sports schools must meet certain functional needs, which directly affects their design. For sports facilities, it is important that the floors provide:

High load-bearing capacity. Sports schools use various types of activities: from team sports to gymnastics, which requires durable and stable structures.

Flexibility in use. Sports schools often offer classes in various areas, from individual training to team games. Therefore, the floors must be easily adaptable to different types of activities.

Technical communications. Floors often integrate lighting, ventilation, heating systems, as well as wiring for audiovisual equipment. To do this, it is important to think about the locations for cables and pipes, as well as the methods for laying them, so as not to violate the integrity of the structure.

## 2. Types of floors

Sports schools can use different types of floors, depending on the objectives and characteristics of the facility. The most common options are:

Reinforced concrete floors. They are used to ensure the strength and durability of buildings. Such floors have excellent sound insulation and fire safety. However, their weight may require more complex foundations.



**Figure 1. Nagoya Dome Sports Complex 1997, Nagoya, Japan. Dome with a diameter of 188 m made of steel pipes with a diameter of 65 cm.**

Steel floors. Can be used for lightweight structures, especially when designing sports facilities with a large interior space (for example, training halls or swimming pools). Steel structures can reduce the overall weight of the building.

Sandwich panels. Modern lightweight and durable materials that have good heat and sound insulation. They are used for external and internal walls, as well as for floors in administrative parts of the building.



*Figure 2. "Nantong Stadium", Nantong Roof (China)*

### 3. Design features for sports facilities

Designing floors in sports schools includes several specific aspects:

**Floor height.** For sports halls and swimming pools, it is important to design floors with a large height to provide the necessary conditions for training and competitions. For example, in a basketball or volleyball hall, the height should be at least 7-10 meters.

**Sound absorption and acoustic characteristics.** In sports schools, especially in rooms with high activity, it is important to create a favorable acoustic environment. The floors should be designed with materials that minimize sound transmission and ensure a comfortable perception in the room.

**Strength and resistance to dynamic loads.** Intense physical activity often occurs in sports halls, such as jumping, falling or hitting a ball. The floors should be designed to withstand such dynamic loads without damage.

**Fire safety.** Fire safety is an important aspect when designing the floors of sports facilities. It is important to use materials that not only meet fire resistance standards, but also ensure the evacuation of people in emergency situations.

### 4. Floor Materials

Modern technologies allow the use of innovative materials that provide strength, durability, ease of installation and aesthetic qualities. Some of them include:

**Reinforced concrete.** This is a classic floor material that provides stability and durability. Concrete can be reinforced with both steel reinforcement and composite materials, which increases its strength.

**Composite materials.** These materials, such as carbon and fiberglass, can be used to create lightweight but durable structures. They are often used for specialized sports facilities.

**Honeycomb panels and multi-layer coatings.** For sports facilities such as gyms, lightweight but durable coatings are used that help distribute the load evenly and reduce the risk of injury.

### 5. Aesthetic and architectural features

Unique floors should not only meet functional requirements, but also take into account the aesthetic features of the building. Architects often design floors in such a way that they become part of the visual concept of the sports complex. This may include the use of original shapes, a combination of

different materials and the creation of spectacular lighting solutions, such as skylights or LED panels integrated into the ceilings.

#### 6. Technological innovations

In recent years, innovative solutions have been actively used in the design of sports school ceilings, such as:

Modular structures. This allows sports schools to be built quickly and efficiently with minimal costs. Modularity provides flexibility in design and allows the space to be adapted for various sports.

Use of BIM (Building Information Modeling) technologies. These technologies allow the creation of accurate 3D models of buildings, which simplifies design and construction, and also helps to better manage the operational process.

**Conclusion.** Designing unique sports school ceilings requires a comprehensive approach and consideration of many factors, from functional requirements and safety to aesthetic preferences. Modern technologies and materials allow creating not only durable and safe, but also visually attractive structures that meet the latest world standards. It is important to remember that each sports facility has its own characteristics, so the design of ceilings should be maximally adapted to specific tasks and operating conditions.

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