The Origin and Development of Boxes in Sports Architecture

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Abstract. Since the 1990s, under the pressure of marketing, the box was set up in the NBA (National Basketball Association) arena in the United States, which made the application of the box in the stadium popular. The study of boxes is of far-reaching significance for stadiums and gymnasiums. It not only improves the current situation of poor operation and low utilization rate of stadiums and gymnasiums, but also responds to the needs of consumers for the commerciality and entertainment of stadiums and gymnasiums.

1. The definition of the box
The term "box" originally means a single-seat seat, which was initially found in architecture. The box of sports architecture first appeared in the Ancient Colosseum. The definition of the 'Box' here is: different from the ordinary open audience seats, usually a luxuriously decorated single room surrounded by four walls, with its own stand, allowing ten to thirty people to watch the game (figure 1) [1].

Figure 1. Inside the Stockholm Wukesong Basketball Hall

Figure 2. Roman gladeship box position

Figure 3. Location of the Stockholm Olympics

2. The origin of the box
In ancient Rome, special unit-style seats and spaces which we now call the box, appeared in sports architectures such as the Colosseum (figure 2). The Colosseum is an oval of 20,000 square meters. There are 60 rows of seats around the central performance area, which can accommodate 80,000 people. The seats with own stairs and access are divided into five zones in order to serve different classes. In the first
row, there are marble boxes, especially for the emperors and officials. The box of the sports architecture as a manifestation of the authority of the official originated from here[2] [3].

3. The development of the box in the Olympic Stadium
From the first modern Olympic Games held in Athens, Greece in 1896, the Olympic architectures have attracted worldwide attention. The box, along with the development of Olympic stadiums, has been developed.

3.1. Appearance of the box in the modern Olympic architecture
The first appearance of the box in the modern Olympic architecture was in Sweden in 1912, the Stockholm Olympics. The Korolev Stadium designed by the Swedish architect Torben Grut has officially incorporated the design of the box into the sports architecture. In the original design, there were only 7,500 seats in the stadium. In the middle of the east seats are the royal seats. The seats below are converted into box styles. Each box can accommodate 4-10 people with better view and larger size than usual. (figure 3).

3.2. Development of Boxes in Modern Olympic Architectures

3.2.1. Stadium. With the development of the stadium, the number of boxes has gradually increased. Its position gradually moves from the top down to the middle of the two-story stand, which not only has the best sight, but also no longer affects the overall roof shape of the stadium(table 1).

| Table 1. The development process of the box in famous Olympic Stadiums |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Tokyo, 1964                 | Mexico, 1968                | Munich, 1972                | Moscow, 1980                |
| Barcelona, 1986            | Athens, 2004                | Beijing, 2008               | London, 2012                |

At first, all the boxes of the stadium have always been the place for leaders. Inspired and driven by the box of the professional gymnasium, the box of the Olympic Stadium has began to sell tickets. For example, in 2008 Beijing Olympic Stadium, the Bird's Nest, there are 140 boxes. And recently, one 60m² box was rented at a price of 8 million for 30 years. Such huge profits have undoubtedly become the fuse for the rapid development of the box in recent years.

3.2.2. Gymnasium. The development of the box in the Olympic stadium has been very slow. On the one hand, the Olympic Stadiuems are mostly funded by the government, they have not paid much attention to the operation of the venues. On the other hand, there are few competitions after the Olympics, which means the low attendance rate resulting in little profit of the boxes.

In recent years, the design of basketball and tennis courts in the Olympic Games is in line with the design of the professional league's arena. Most of the arenas will be handed over to the professional operation after the Olympics. The professional league and large-scale concerts are frequently held as a profit point. At this time, the number of boxes in the arena will have a quantum leap and the design will be improved.
For example, Basketball Hall of the 2010 Guangzhou Asian Games - Guangzhou Sports Performance Center (figure 4) is the first NBA standard basketball stadium in South China. The hall has designed 60 ring-shaped boxes, which are embedded in the design and business concept of the NBA Arena[4].

4. The development of the box in the NBA professional league venues
The West club operating model is different from the Chinese. Western clubs often host large-scale sports competitions all year round. NBA has a number of clubs, each year holding about 1300 world-class basketball games. The audience can reach more than 20 million, which makes a total of nearly one billion dollars in profits. Below we take the NBA basketball hall as an example to introduce the construction process of the box in the professional league venue.

4.1. The appearance of the box in the NBA venue
After the establishment of the NBA in 1946, the construction of the arena has experienced more than 60 years of history. Each club has a special arena as the home court. At the 1960-1980 stage, a large number of teams joined the NBA, especially in the 1976 NBA annexed the ABA (American Basketball Association), which laid the foundation for the absolute strength of the league in the US basketball. The expansion of the alliance has contributed to the renovation of the stadium. Almost all clubs have been renovating the stadium during this period. For example, the Houston Rockets, from 1975 to 2003, the team settled in the Compaq Center, using the stadium for 28 years. The venue has a total of approximately 16,200 seats and 20 boxes on the top floor (figure 5). This is the first time the box has appeared in the NBA venue[5].

4.2. The development of the box in the NBA venue
Since the 1990s, NBA venues have witnessed a new trend of construction and reconstruction. In order to increase the utilization rate and profitability of the venue, most basketball halls have designed a large number of boxes to obtain high profits for tickets.

The reconstruction of NBA basketball hall is often because of the number of the boxes is too low rather than the scale of the hall. For example, the Golden State Warriors' stadium as one of the oldest stadiums in NBA was put into use in 1966. Before the start of the 1997-1998 season, the arena was completely refurbished with 72 luxury boxes added (figure 6) [6].

Figure 4. Guangzhou Sports Performance Center in line with the professional league

Figure 5. Compaq Center Box Location

Figure 6. Golden State Warriors Arena Box
The following table is about representative stadiums in the NBA since 1990. We can see that the number of boxes in them is at least 50, and most of them have more than 90 (table 2).

**Table 2. Box situation in the NBA arena**

| Stadium Name       | Arena Name         | Number of Boxes |
|--------------------|--------------------|-----------------|
| Houston Rockets    | Toyota Center Arena| 103             |
| Detroit Pistons    | Auburn Hills Palace| 180             |
| Phoenix Suns Messi| Arena 94           |                 |
| Washington Wizards | MIC Center Arena   | 114             |
| Portland Trailblazer| Rose Garden Arena   | 76              |
|                   | Wachovia Center Stadium 80 | |
| Golden State Warriors Auckland | | 60 |
| New Orleans Hornets| Auckland Stadium 70 | 53              |

5. **The development of boxes in Chinese Sports Venues**

From the 1990 Asian Games to the 2008 Olympic Games, and then to the 2010 Asian Games, the design of the box in the stadium has also gone through the process from scratch to becoming more and more rational in China. However, because of the institution, large stadiums will only be built by government when major events are held. There are no mature clubs to build stadiums themselves. Therefore, we are here to take the stadiums built by government as an example to see the development of the box.

In China, the number of boxes is increasing and the level of the design is being improved; but the box is only designed in basketball and tennis stadiums, which can hold the professional league (table 3) [7].

**Table 3. Box development of venues in China's large-scale events**

| Stadium Name       | Details                          |
|--------------------|----------------------------------|
| Beijing Asian Games Workers | Stadium 0 box                     |
| Beijing Olympic Bird's Nest | 140 boxes                        |
| Guangzhou Asian Games main stadium | 117 boxes                     |
| Basketball Hall    | Beijing Asian Games Glorious Stadium 0 boxes |
|                     | Beijing Olympic Wukesong Basketball Hall 45 boxes |
|                     | Guangzhou Asian Games Sports Performance Center 60 boxes |
1990 Beijing Asian Games
During the 1990 Beijing Asian Games, facilities such as athletic field, swimming pool, gymnasium and hockey stadium were built. In the athletic field, technical special boxes such as radio and television are set up, and there is no box specially designed for the audience to watch the game. There is also no box design for the gymnasium or the swimming pool. It can be seen that due to historical conditions at the time, China's sports architectures are still relatively backward compared with Western sports architectures at the same time.

2008 Beijing Olympic Games
Box appears during the Beijing Olympics. It is combined with the business, and its function is changed from a single to a composite. It also has a special streamline that is closely integrated with the VIP lounge. The box is more perfect in terms of area ratio, internal function setting and interior decoration. Wukesong Stadium is the venue for the Beijing 2008 Olympic basketball competition. There are 45 luxury boxes in the hall, 29 large boxes and 16 small boxes.

2010 Guangzhou Asian Games
The main stadium of the Guangzhou Asian Games designed 117 boxes. As the main venue of the Asian Games, Guangzhou International Sports Performance Center has made a breakthrough in the design of the box. It is a new platform for world-class sports entertainment, integrating sports and performing arts activities. The venue adopted the commercialization model of the US NAB. With a total construction area of 120,000 square meters, the venue has 18,000 auditoriums and 60 360-degree luxury VIP boxes. And there is a private bar and club area behind the seats.

6. Conclusion
The development of boxes in Chinese venues still lags far behind those of Western countries. By comparing the differences of sports concepts between the West and the East, this paper introduces the development process of boxes in sports buildings in Western countries, and the development of boxes in stadiums and Gymnasiums in large-scale competitions in China in recent years. With the development of the globalization of sports and the importance attached by the owners to the later operation of sports buildings, the importance of the box will become increasingly prominent. I hope this article will help the design of future sports architectures [8].

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