

# The concept of “opened” sports architecture in Japan: Case studies of completed works since 2000

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**Abstract:-** *The purpose of this research paper is to clarify the concept of “opened” sports architecture of Japan since 2000. The Tokyo Olympic Games held in 1964 became a big opportunity for appealing Japan, which has achieved dramatically postwar economic recovery, to the world. Yoyogi National Stadium by Kenzo Tange appeared in such timing. The stadium, which has still been contemporary and innovative, with its modern space and its latest technology is not only a symbol of Japanese architecture post war, but also its symbolic presence in Tokyo. After that, sports architecture with a symbolic and landmark presence of the city gradually reviewed its architectural behavior, and discussed it as to how to adjust to local area. As a result of discussion, this concept as “open” architecture toward the town came up with not only for sports architecture but also other building types. To open from the building shall be opened physically through glazing etc., but it is also used in the sense of integrating into the region and unity it.*

*The paper is to understand the evolution of coming up with opened sports architecture then discuss the idea and its method through specific case studies. Firstly, sports architecture since 2000, which has been intended the concept “open”, was targeted while outlining the evaluation of postwar sports architecture from the historical approach. Analyzing the discourse by architects and drawings of focused architecture, the idea and its features of plan and section of opened sports architecture were clarified.*

**Key Words:** Japanese Architecture, Contemporary Architecture, Open Stadium, Postwar, Urban Park

## 1. INTRODUCTION

The paper addresses the architectural intention and its method of “opened” sports architecture through the evolution of the sports architecture in Japan.

Sports architecture varies in size as well as outdoor or indoor depending on the events. The paper targeted all of sports architecture composing a court/field. The condition of the building size as well whether indoor or outdoor are crucial points so that the paper segregates those conditions then seeks the architectural philosophy and its method of opened sports architecture in Japan.

Architect Hitoshi Abe stated “almost of building type for Stadium is the centripetal composition which is statistic and enclosed by the uniform sectional shape.” Focusing the works from 2000 afterward, it can be seen that the sports architecture was open for the city and townspeople. Architectural method which was to open for the denizens was not only important for Stadium but other building types were also equally focused.

Post war Japan, Yoyogi National Stadium was presented by Star Architect, Kenzo Tange (1913-2005) in 1964. It was the greatest architecture of that era which showcased the quality of the space and technology in all over the world as a symbol of the postwar economic recovery. Though there were other various sports architecture represented the time, the opened sports architecture made its presence felt since 2000.

The buildings targeted limited sport architecture in the article which was published in the Japanese magazine “Shin-Kenchiku (New architecture)” between January 2000 and present (December 2017). The magazine was first issued in 1925 and was renowned in Japan as an architectural professional magazine. Also, reliability of the magazine where carried buildings are the representative of the time/moment, is high. Needless to say, focused buildings will try to grasp what stadium worked out for 20 years because huge institute/ structure like stadium takes approximately more than 5 or 6 years to complete from the beginning of the project.

There are 66 realized buildings which were illustrated in the magazine “Shin-Kenchiku.” In it, “Basement” type is the most relevant to the opened sports architecture, as the architecture can be divided into 3 types which are “Suspend”, “Ground”, and “Basement” according to the placement of the courts (Fig.1). Moreover, 9 buildings designed by Japanese architects are located on the outskirts of Japan, the paper includes these buildings. Focusing 4 buildings, out of 7 building of the basement types, the paper will be discussed due to limited pages (Table 1).

**Table -1:** List of the “Basement type” of sports architecture (Source: Reference 2-5)

No.	Type	Building Name	Architect	Construction Year	Site Area (m <sup>2</sup> )	Total Area (m <sup>2</sup> )	Floor	Structure
1	Stadium	Miyagi Stadium	Hitoshi Abe	2000	1,244,079	57,565	7	SRC, RCC, S
2	Stadium	Oita Bank Dome (Big Eye Stadium)	Kisho Kurokawa	2001	2,550,000	92,882	B2+3	S, RCC
3	Gymnasium	Plywood Structure-04	Shigeru Ban	2002	2,041	980	B1	T+S
4	Gymnasium	Onishi Hall	Kazuyo Sejima	2005	8,849	2,276	B1+1	T+S, S, RCC
5	Indoor Stadium	Slowtecture M Beans Dome	Syuhei Endo	2007	1,124,000	16,167	1	S, RCC
6	Stadium	The Main Stadium For The World Games 2009 In Kaohsiung	Toyo Ito	2009	189,012	98,759	B2+3	S, RCC
7	Gymnasium	Omiyamae Gymnasium	Jun Aoki	2014	6,184	5,763	B2+2	RCC, S

SRC: Steel Reinforced Concrete

S : Steel

RCC: Reinforced Cement Concrete

T: Timber

As methodology of the research, firstly, the trend of sports architecture will be assimilated since postwar by 2000, even though the paper addresses the architecture after 2000. Moving further, the philosophy and its method of opened sports architecture will be discussed through analyzing the targeted 4 buildings including the drawings and discourse by the architect.

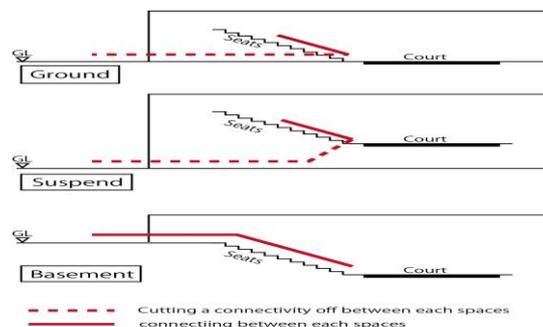
Research material includes 216 magazines which extracted only sports architecture on the architectural professional magazine “Shin-Kenchiku” from January 2000 to present, December 2017. Furthermore, “GA SPORTS” edited by A.D.A Tokyo is available as supplementary references in order to understand the evolution of sports architecture in Japan as well as in the world [6]. In addition, there are no precedence researches for the purpose of clarifying the philosophy and its method through the evolution of sports architecture in Japan.

## 2. Consideration of Sports architecture in Japan from historical approach

### -Evolution of sports architecture from postwar to 2000

Though there were huge numbers of buildings of sports architecture, Tokyo Olympic Games in 1964 played a prominent role in portraying sports architecture successful as a postwar architectural heritage. Japan which has developed the infrastructure such as highway, bullet train etcetera all over the country since 1945 is in the name of the history of postwar economic recovery, developed the National Stadium to held the Olympic Games. Yoyogi National gymnasium designed by Kenzo Tange as a symbol of Nationalism. As quality and technology of the architecture Japan has shown to all over the world that Japan has excelled economically post war.

The two decades from 1955 to 1973 are the period of the rapid economic growth in Japan. As a result construction of the public facilities including sports architecture has been constructed everywhere under the government initiative. For example, Kagawa Prefectural gymnasium designed by Ar. Tange was also the representative of the time (Fig.2). Its architectural feature is dynamic shape by the concrete. Likewise, other architects also worked out on sports architecture at that time. The architecture constructed by the concrete had simplicity and vigorous shape as a result it gained the symbolic importance and turned to be a landmark for the town as a typical modernism architecture.



**Fig -1:** Three types of sports architecture (Source: Author)

In 1980-90s, Fujisawa Municipal Gymnasium and Tokyo Metropolitan Gymnasium designed by Architect Fumihiko Maki (1928- ) came out as a latest trend (Fig.3). According to the word of Ar. Hidetoshi Ono (1949- ), as the phenomena happened in those days of Japan, “as per penetration of democracy and economical margin of the nation, the character of the sports is main activities for people to spend time [1]”. Ar. Ohno especially mentioned about Tokyo Metropolitan Gymnasium, “the height of the building was controlled to remain low and it could minimize discord with surrounding buildings and landscape. In addition, the buildings’ shape, material, locating open spaces were the main factors which were considered before constructing. And individual spaces of outdoor in-between of the buildings have been given the specific character. Thus, architect incorporates the context of Tokyo into the composition of the buildings. [1]”

Sports architecture by the timber structure has appeared since the latter of 1990s. Odate Jukai Dome designed by Architect Toyo Ito (1941- ) is one of the example. It is a wooden dome using laminated lumber of local cedar, despite its structural disadvantage. Though wood is structurally weak, soft and inflammable material in comparison of steel and concrete, wooden dome with huge span realized by both of Japanese traditional techniques being familiar with wood from ancient times and latest technology used by structural engineers. Thereby, seeking the unknown space of architecture began instead of concrete and steel.

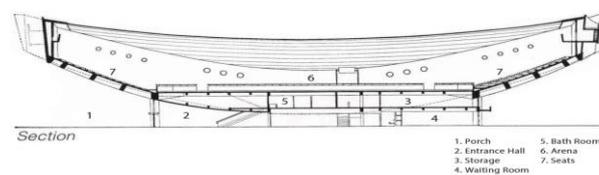


Fig -2: Section of Kagawa Prefectural gymnasium (1964) (Source: Yukio, F. (ed.) (2007), pp. 34-37)



Fig -3: Overall view from southeast of Tokyo Metropolitan Gymnasium (1990) (Source: Yukio, F. (ed.) (2007), pp. 84-91)

### 3. Analysis of the opened sports architecture

#### 3.0 The configurations of sports architecture and its buildings focused on the paper

Sports architecture requires the court/field firstly. Its name and role of structure would change or depend upon composing covered or not and seating or not. These three major components are court, cover (roof) and seating so as to composing sport architecture. In the paper the significance for “opened” sports architecture is the position of the court and the positions are identified by these three types as per the section of the building; basement, ground and suspend (Fig.1).

Suspend type means constructing a court above ground floor and which is rare. In case of its type, the space on the ground level is used for other facilities, practice courts and so on, so that the continuity from the ground would be temporarily cut off. As an example is Kagawa Prefectural gymnasium by Kenzo Tange, there are only 2 buildings out of 66 buildings focused in this paper. Even if analyzing those 2 buildings, the relation/connectivity from ground level cuts off and internal space such as field/ court is not opened towards outside.

59 buildings with the court placed on the ground level, and 7 buildings with court placed in the basement out of 66 buildings were extracted; however, 7 buildings of basement type have been designed rather it costs more intentionally, even if the client has no requirement to place it in the basement. This is strongly related to the “opened” sports architecture targeting in this paper.

The basement type has taken advantage of the overall height of building which can be kept at a low level. Even gymnasium or stadium require a certain height depending on the sports events, so that the height of building from ground level can be kept low if the court is located below ground level. Also in many cases of basement type, the continuity from the ground to the field and audience must be one of the major features. However, even in the case of ground type, there are

cases that the entrance is set on a call the 1st floor level while providing continuity with the field and the seating from outside.

Analyzing the architect's discourse and its designing method, "basement" type was mainly focusing on "opening" method of the sports architecture. As mentioned before, targeted buildings on the paper are seven buildings which are of basement type (Table.1). Following focused buildings are, especially, 4 buildings out of them due to limited pages; as a large scale stadium 1) Miyagi Stadium and 2) the main stadium for the world games 2009 in Kaohsiung, as a regional gymnasium 3) Onishi multiple hall and 4) Omiyamae Gymnasium.

### 3.1 Large-scale of the sports stadium

#### 3.1-1 Miyagi Stadium (2000, Architect : Haryu and Abe collaborated atelier)

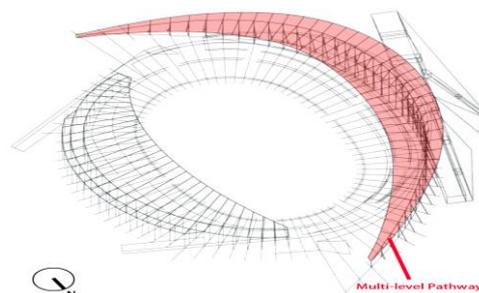
In word of Ar. Abe, his concept of the stadium as follow, "Opened stadium – Stadium is historically required connoted and enclosed shape for the huge entertainment. It (Miyagi Stadium), however, has installed one of the solutions for open as well as anti-hierarchy of modern society. Stadium should open toward outside for the event of not only <HARE (sacred)>, which is big events, but also <KE (secular)>, which is for everyone for small daily events and walking. Thus, I consider that outside & inside of stadium, and performers & spectators & variety of persons which are walking and playing etc. should have gently and continuous relations [2]."

Through plan and section of their drawings, how could architect achieve the realization of the building along with his ideas? Focusing the plan, the oval plan has added the multi-level pathway which penetrates through the stadium. Its pathway goes round the stadium, then generates multi-level circular plaza (Fig.4-5). "The pathway is able to pull identity/activity of inside space out and to pull identity/activity of outside space into inside. It takes a roll of the landscape like huge tornado which is caught in various human activities [2]" as Abe said, his intention of the configuration is to extend various activities of internal as well as external and to generate continuity between internal and external, then to open a part of the closed stadium as a result.

Looking at the section, "eastern hill for back stand is <the venue like a mountain opening toward outside> and stadium is <the venue like a valley enclosing toward inside>. I would like to generate the venue including the pair concept together [2]," he insisted. Although designing the stadium would draw attention of only internal enclosed field/court, Miyagi stadium has the event plaza outside stadium with relation by the multi-level pathway. Thereby, even if internal field is not used for any event, this stadium could be utilised for townspeople anytime as an open air theatre. In that sense, the stadium can be opened.



**Fig -4:** Aerial view of Miyagi Stadium (2000) (Source: NOBUYUKI, Y. (ed.) (2000), p90)



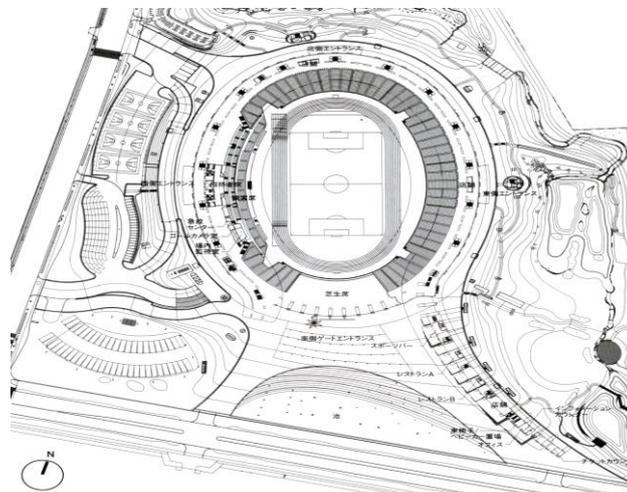
**Fig -5:** Composition of Miyagi Stadium (2000) (Source: NOBUYUKI, Y. (ed.) (2000), p90)

**3.1-2 The main stadium for the world games 2009 in Kaohsiung (2009, Architect : Toyo Ito)**

Kaohsiung National Stadium designed by Architect Toyo Ito is situated in Kaohsiung, Taiwan, and just the “opened” stadium reflected by his own concept like Miyagi stadium. Ito proposed three concept, these are “Open stadium”, “Urban Park”, “Spiral Structure”. Although Spiral Structure is not discussed in the paper, the former two concepts were essentially the same perspective which Ar. Abe has supposed.



**Fig -6:** Kaohsiung main stadium (2009) (Source: Nobuyuki, Y. (ed.) (2009), p.40)



**Fig -7:** Site plan of Kaohsiung main stadium (2009) (Source: Nobuyuki, Y. (ed.) (2009), p.46)

Focusing the discourse by Ar. Ito further, “differing the once closed stadium, the seating of Kaohsiung National Stadium opens toward the main gate. Thereby the open stadium which can welcome all visitors from MRT station on the SW side of the site. That is the first concept.....Open stadium is able to utilise and contribute that the plaza in front of entrance and main field can easily blend together every day in case of not having an event. Hence, second concept is Urban Park which built relationship with the whole site and townspeople as a new type of the park. [4]”

How has architect integrated his idea into his stadium? Analyzing the plan and section, firstly the roof has extended towards the station on the plan (Fig.6-7). Further, in contrast of enclosed shape for once stand and its roof, they opened towards outside physically. As showing pictures, a part of the inside stadium is exposed. Through its opened part on the west side entrance, everybody can have a view toward inside of stadium without getting their own seating. Also, the plaza in front of west side entrance is opened and jointly used with stadium.

### 3.2 Regional gymnasium

#### 3.2-1 Onishi multiple hall (2005, Architect : Kazuyo Sejima)

Regional gymnasium is also large in size of plan and section in comparison to surrounding environments and it is a symbolic building. But sports architecture discussed in this chapter has positioned opposite side which means anti-symbolic and anti-landmark presence. Its concept is to unify it into region/town landscape by reducing the sense of visual size so as to fit to the town.

Firstly, regarding to Onishi multiple hall she mentioned “it was expected to create the place called a “plaza” which means whole site including the buildings in the three ways; 1)Transparency for being able to see whole site from anywhere, 2)A variety of circulation, 3)Arrangements of separated blocks which are irregular curved volumes [3]” (Fig. 8). Also she controlled the height of the whole building up to 5030mm in the way of placing the court of gymnasium on basement (Fig. 9). The height is lower than the surrounding residence. External wall consisted of all curtain wall (float glass t=15mm) so that users including staffs can look over the whole buildings as well as surrounding residences over the buildings (Fig. 10).

The beam composed of local cedar and steel plate is only 270mm thickness for approximate 19m (Fig. 11). (The project was required to using local cedars from the beginning in order to rejuvenate the local industry.) In case of spanning long distance, large section members would use for as a quality of the wooden material. Sejima realised that large span beam looks simplicity and lightness by the hybrid structural beam. This structure contributed reducing the height of the building.

Focusing the plan, the building is three separated blocks which consists of curving shape plan and there are pathways between separated blocks (Fig. 8). “After the inauguration, all of the building as well as its site has opened so that the place is utilized for not only user of the hall but also passers-by taking some rest inside or school children on their way to home [3]” as Sejima said, she has presented an open plaza for townspeople outside building. It takes a roll of playing on outdoor field and getting the view toward the court setting on the basement as a stand (Fig. 11).

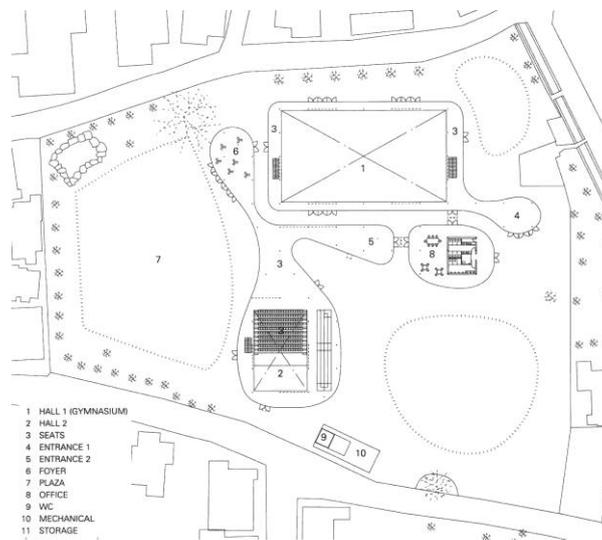


Fig -8: Site plan of Onishi multiple hall (Source: Yukio, F. (ed.) (2007), p282)

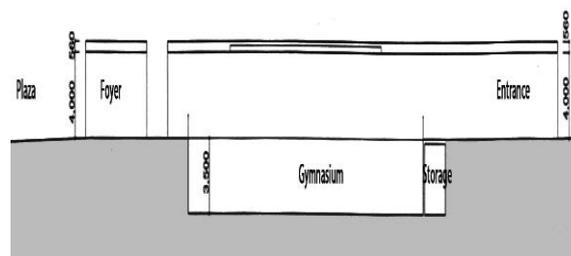


Fig -9: Section of Onishi multiple hall (Source: Nobuyuki, Y. (ed.) (2005), p74)



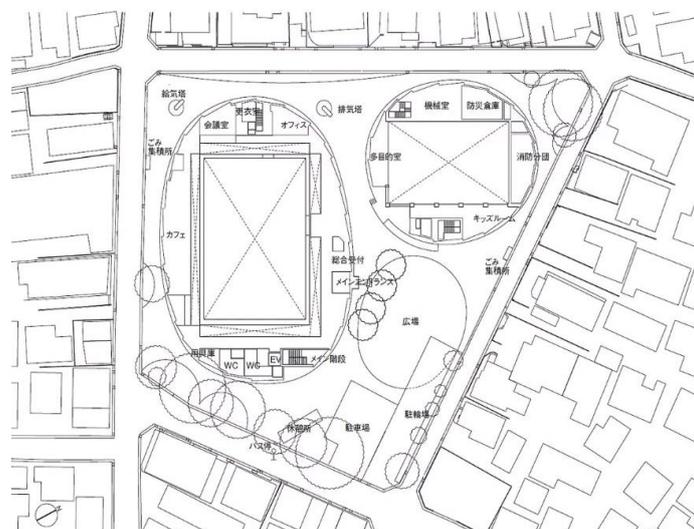
**Fig -10:** Photo of Onishi multiple hall (Source: Nobuyuki, Y. (ed.) (2005), pp.70-71)



**Fig -11:** Photo of gymnasium of Onishi multiple hall (Source: Author)

### 3.2-2 Omiyamae Gymnasium (2014, Architect: Jun Aoki)

The second is the Omiyamae Gymnasium which is situated in densely built-up district of Tokyo and its concept closely resembles the Onishi hall by Sejima in the different manner. He mentioned as how to establish huge-scale of institute in the residential district, “the sports architecture employs for entirely townspeople to improve their health daily, not for a competition. So, the building was constructed not only for exercise but also for taking a rest at the open spaces on the roof etcetera while walking around here. [5]” Moreover, he continues “the height of the building was controlled because the surroundings are almost two storeys residence..... The lower volumes of the buildings got closer to the sense of the scale of surrounding residences. And, separated plan of two ellipses is useful in leading the site and townspeople cross the site anytime (Fig. 12).



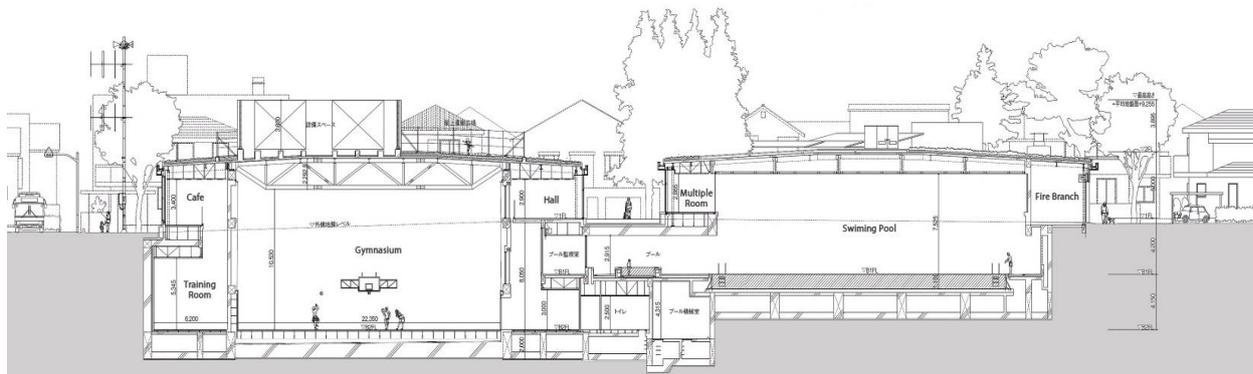
**Fig -12:** Site plan of Omiyamae Gymnasium (Source: Nobuyuki, Y. (ed.) (2014), p.41)

That's why there is no boundary wall to deny townspeople. [5]" The building is aimed to adjust to the region while criticizing symbolic presence. At first sight, nobody can recognize that the building includes gymnasium and swimming pool on the basement (Fig. 13).



**Fig -13:** Photo of Omiyamae Gymnasium (Source: Nobuyuki, Y. (ed.) (2014), pp.42-43)

According to the section of the building, the maximum height of building was controlled 9,225mm and gymnasium court was located more than 8m below ground level (Fig. 14). On the ground level, there are local facilities which are concerned for townspeople, for example, a warehouse for disaster prevention, multiple room and café. As per the plan of the building, separated blocks like the Onishi hall contributes the resting place for townspeople as a community park in the residential district. So, walking around the building, the scene of playing at gymnasium and swimming pool can be seen from the road intentionally. Thereby, sports architecture which is huge building as a landmark took the place of the anti-symbolic and anti-landmark structure as an open plaza.



**Fig -14:** Section of Omiyamae Gymnasium (Source: Nobuyuki, Y. (ed.) (2014), pp.50-51)

#### 4. Conclusion

Innovation of sports architecture by Yoyogi National stadium was a dynamic and had symbolic shape as well as spaces, and responding surrounding environment (This structure was created by a collaboration work with structure engineer). Beyond Tange, re-considered the relationship between citizen and public facilities by Ar. Maki, sports architecture is closer to the citizen as a leisure facility. After 1990s the large span of the wooden structure for sports architecture is increasing instead of using modern material, steel and concrete due to development of technology by structure engineers as to utilize local wooden material and techniques and seek new possibility of the space.

Opened sports architecture is an extension of daily life for townspeople and its point is how it can unify/integrate to surrounding environment. It is the way of open not only for the sports architecture but also for every facility these days as a result it leads to the opening of the public links with architectural philosophy and its method of that time. Historically, sports architecture was generally closed. Through analyzing, it is a new concept for sports architecture that how it can open and what will open toward townspeople and town itself. Architect has controlled the height in the way of placing a court in the basement. Its concept has directed, so to speak, anti-symbolism and anti-landmark. Moreover, it is evolving from something special into a part of the leisure facilities for citizen through the relationship with the building and townspeople. The architecture would open toward townspeople physically as well as toward town. That is the latest case studies of sports architecture in Japan.

**REFERENCES**

- [1] HIDETOSHI, O. (2018) Tokyo Metropolitan Gymnasium [Online] HIDETOSHI, O. Available from: [http://kingo.t.u-tokyo.ac.jp/ohno/po/article\\_Folder/tokyototaiikukan.html](http://kingo.t.u-tokyo.ac.jp/ohno/po/article_Folder/tokyototaiikukan.html) [Accessed 28/01/2018]
- [2] NOBUYUKI, Y. (ed.) (2000) Shin-Kenchiku June - Miyagi Stadium, Tokyo: Shinkenchiku-sha, pp.84-99
- [3] NOBUYUKI, Y. (ed.) (2005) Shin-Kenchiku May- Onishi multiple hall, Tokyo: Shinkenchiku-sha, pp.64-75
- [4] NOBUYUKI, Y. (ed.) (2009) Shin-Kenchiku May - the main stadium for the world games 2009 in Kaohsiung, Tokyo: Shinkenchiku-sha, pp.38-49
- [5] NOBUYUKI, Y. (ed.) (2014) Shin-Kenchiku July - Omiyamae Gymnasium, Tokyo: Shinkenchiku-sha, pp.36-53
- [6] YUKIO, F. (ed.) (2007) Global Architecture –contemporary architecture 09 Sports, Tokyo: A.D.A. edita Tokyo Co., Ltd.