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MANAGEMENT OF MOVEMENT OF VISITORS IN A SPORTS FACILITY

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Abstract

Management of movement of visitors in a facility is essential for a successful organization of a sports event. From a visitor's entrance into the premises of the sports facility to its place on the stands, corridors have to be defined. Depending on its position, a corridor is additionally divided into logical zones: a zone between a border of the plot and the facility, an outer zone, an internal zone, a zone of seats or stands. Precise specification of needs within a zone is used to organize movement of visitors safely and efficiently. Communications can be horizontal and vertical. Each group has set rules for design and maintenance. Depending on the applied technical solution, entrances have a defined capacity that must be taken into account when a sporting event is organized. Besides the entrance for visitors, there are many entrances dedicated to specific groups such as competitors, VIP, security, service, medical assistance, media, persons with special needs, etc. Management of movement of users in a facility must be a subject of careful analysis because it is of a great importance for the general impression on the quality of a sports facility.

Key words: ENTRANCES / CORRIDORS / SAFETY OF MOVEMENT / MANAGEMENT OF MOVEMENT

INTRODUCTION

Management of movement of visitors in a facility is essential for a successful organization of a sporting event. Due to successful organization of movement from the entrance into the premises of a sporting facility to the seats or stands for visitors, precisely shaped corridors must be defined. Zoning is also of a great importance because the needs of users change depending on the characteristic zone of a corridor in which it is located. Because of that, depending on the position in relation to the entrance and the stands, corridors can be additionally divided into the logical sequence: the zone between the borders of the plot and the facility, the outer zone, the internal zone, the visitors' zone - zone of the stands. It is simple to organize safe and efficient movement from and to the place on the stands by a precise division of characteristic zones of movement of visitors and specifications of needs within the zone (Mitrović, 1983; Ilić, 1998).

Communication and entrances into the facility are equally important places for visitors on their way to their place on the stands. Management of movement of users in the facility has to be a subject of everyday analysis and careful maintenance bearing in mind the importance of efficient movement of users for the overall impression of the sports facility quality. (Department for Culture, Media and Sport, 2008)

The aim of this paper was to specify and analyse movement of users from the entrance into the premises of the facility to their places on the stands, defining elements of the corridor, analysis of certain zones within the corridor, specification of conditions for designing and maintaining the lines of movement in a sports facility. It can be expected that the paper will contribute to better understanding of the question of designing and maintaining lines of movement of visitors in a sports facility, and thus better maintaining of movement of visitors.

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MOVEMENT OF VISITORS IN A FA-CILITY

Two basic principles to manage movement of visitors in a sports facility can be defined through the need for security and convenience in movement (Geraint, Sheard, & Vickery, 2007; UEFA, 2011a; FIFA, 20116).

Safety

The concept of safety can be understood as a need to avoid the occurrence of panic, security from vandalism, disorderly conduct, injuries, fires, terrorist attacks, any kind of accident, etc. The design of the sports facility should be such as to prevent all the above consequences (FIFA, 2004; OECD, 2011).

Convenience in movement

This term implies simplicity, lightness, movement without excessive physical and mental exertion, the absence of a sense of being lost, with clear directions. In doing so, all elements of the facility used to help the movement of visitors, such as ramps, stairs and elevators, must meet all requirements stipulated by regulations.

ZONING OF A SPORTS FACILITY

According to the type of the event, the whole sports facility can be divided into several zones:

- 1. Zone of the field of play,
- 2. Zone of the auditorium,
- 3. Zone of internal communication,
- 4. Zone of external communication,
- 5. Zone between the sports facility and the limits of the premises.

The aforementioned zones exist both in small and in large sports facilities. Each of these zones are further divided into subsections that have originated as a requirement imposed in practice. For example, the audience is divided according to zones reserved for the fans of the two sports clubs, or within the said zones according to the different categories of the seating. In practice, partition walls between individual zones are elements such as fences, walls, or denivelation (Ortner, 1956; Geraint, Sheard, & Vickery, 2007; Russ, 2009).



Picture 1 Zones of a football stadium during a FIFA event: 1. The public zone, 2. The exclusive zone of the sports facility, 3. Outer perimeter (visual ticket check), 4. Inner perimeter (electronic access control), 5. The stands. A. Ticketing clearing point; B. Mags and bags; C. Turnstiles; D. Stadium ticketing centre (adjusted to FIFA 2011a).

ENTRANCES INTO A SPORTS FACIL-ITY

Entrances into the sports facility are arranged according to users' needs so that they go from the entrance into the facility towards their destination in the safest and the most efficient way. Entrances can be grouped according to the type of user as follows:

- 1. Entrances into the stands,
- 2. Entrances into VIP areas,
- 3. Entrances into service rooms,
- 4. Entrances for players,
- 5. Entrances for the security and the police,
- 6. Entrances for medical help,
- 7. Extra entrances for needs of evacuation from the stadium in the case of accident.

All entrances should be used simultaneously either for entering the stadium or for the exit; mixed use is not recommended. All services next to entrances must be at a safe distance from the entrance. It is usually assumed that one open gate can be safely used by up to 4000 visitors per hour, or by 500 to 750 visitors if there are turnstiles (UEFA, 2011a; UEFA, 2011b; UEFA, 2011c).

Location of an entrance in relation to the facility

The entrance must be in line with internal and external communications. At the same time, the space in front of and behind the entrance must meet several conditions. Entrances must be arranged at such distance as to avoid crowding; there should be separate entrances for fans of the rival team, while close entrances can be grouped for easier management of groups of visitors, but only if they are used for the same fan groups or the same type of users. Private entrances are designed for players, VIP visitors, managers, sponsors and the media, and they should be located near the parking lot reserved for them. Also, it is necessary to design entrances that can be used for the needs of persons with special needs (with disability, visually impaired, in a wheelchair, etc.). Emergency exits are located in the perimeter fence and can be opened only in exceptional cases. Evacuation exits are there to empty the sports facility in a few minutes, although several hours may be needed for it to be filled. The recommended minimum width of the entrance is 120 cm (Gallant, 2008; Geraint, Sheard, & Vickery, 2007; UEFA, 20116).

Control of the entrance

From the entrance into the sports facility to the place on the stand, the user has to pass one or several check points. The aim of these checks is ticket control, but also other types of control aimed at the safety of users. The first control is at the very entrance and it implies security control together with the ticket control. The second control is less formal and is mostly dedicated to safety measures. The third control has the security functions and is done on places where special groups of spectators are separated. At each of the listed places there has to be sufficient room provided to avoid obstructions and crowding; bars and restaurants must be located at a safe distance.

Transparency and simplicity of the direction of movement

Because of moving in a group during entering and exit, it is essential for information about directions of movement to be transparent. It is necessary to make spectators safe by regular and clear signalling especially in large sports facilities. Therefore several solutions should be implemented:

a) A number of choices a spectator is faced with on his way to his seat should always be as small as possible (two are recommended),

b) All signs and marks must be visible from the most unfavourable parts of the corridor,

c) Signs must be clear and readable.

Visitors must have two directions to choose from at the most (one of which is the right one). If a spectator is moving in a crowd which is moving fast, and the spectator is under pressure, the number of decisions he can make is reduced, and time needed to choose is prolonged. In addition to visual signs, it is necessary to organize the assistance service. (Smith, 1996; UEFA, 20116; Geraint, Sheard, & Vickery, 2007; FIFA, 20116)

The direction of movement of visitors to the security zone



Picture 2 Triangular surfaces formed sidewise for a temporary stop for visitors to think about further movement without blocking the flow of the crowd on the corridor (adapted from Geraint, Sheard, & Vickery, 2007)

Behaviour of visitors from the entrance to the seat

Conducted studies have defined the main dilemmas and questions a spectator asks on his way from the entrance in the facility to his seat. Signs and instructions in the sports facility have to answer the questions in the most efficient way. Common spectators' questions are: (Gallant, 2008)

- 1. Am I the fan of the home or of the visiting team?
- 2. Do I have a ticket for standing or sitting?
- 3. Do I have a seat in the upper or a lower zone?
- 4. Am I in the blue or red section?
- 5. Is my seat number from 1 to 10 or from 11 to 20?
- 6. Where is my seat in this part of the row?

Clear visibility

In a sports facility, transparency and clearness of information are the first and foremost task. There is no space in the corridor for dramatic games of light and darkness, familiar and unknown that are used in other areas of architecture. All collimation lines along the corridor where spectators are moving must be clear and long to enable easy and quick orientation. Clear visibility is especially important in case of an accident when a spectator is in a group, forced to go along with the others and with reduced concentration. Changes of level must be carefully designed and planned in order not to provoke crowding in front of stairways.

Clear sign system

Sign system is not only a passive system of signs placed to decorate the facility or to surround the building. Its primary role is to answer questions that the spectator may ask to reach his place among the seats as soon as possible and in a simple way. At the same time, we should pay attention to a line of elements that help a person identify the place of the message, comprehend what there is in that particular message, understand it and decide whether to use it or not. Understanding the human sight, field of vision, primary colour of the board with the sign, colour of the sign, font type and size, contrast of the board in relation of the surface, light – all these elements can be helpful in making the decision. This is a job for highly specialized professionals.

Safe areas in the corridor

Areas by the lanes of the route are there for visitors to stop there without preventing the main group to continue moving.

Hospitality lounges

It is recommended that kiosks, bars, cafés, day care centres for children must be at least 6 meters away from the exit or the entrance into the Zone of the sports facility in which they are located (Rick, Langston, & de Valence, 2003; McGregor & Shiem-Shin, 2003).

EXIT OF VISITORS FROM THE FA-CILITY

It is recommended that the exit route from the facility follows the route of the entrance. All recommendations for determination and position of entrances into the facility remain the same for the route towards the exit from the facility. Everything the visitor does while entering the facility remains the same at the exit. He repeats the questions asked from the entrance to his seat are, but in the reverse order.

Two types of exits from the facility are needed: regular and emergency. It is not necessary to visually explain the regular exit. The emergency exit is used in the case of an accident and it must be completed in the defined time frame. In both exits it is always necessary to analyse time needed for exit of visitors from the facility. According to studies and experience, if there are no obstructions during movement, in 60 seconds a spectator can cross 150m on the flat or slightly inclined field, or 30m on the stairway. The distance between people is 2.5m on the flat terrain, or 0.75m on the stairway.

RECOMMENDATIONS FOR SHAP-ING CORRIDORS FOR MOVEMENT OF VISITORS

Gates and turnstiles

Gates are the most inexpensive and the fastest solution for enters into the facility. About 4000 spectators can go through it per hour. Their disadvantage is that they are insufficiently sophisticated for security checks.

Turnstiles are better safety solution, but their entry capacity is from 500 to 750 visitors per hour. Experiences from practice show that the real average number of spectators that can safely go through this type of gate is 660 per hour. If the stands have to be filled for a shorter time, it is necessary to provide a larger number of such entrances. Entrances to the stands can have a system that records the number of visitors which helps security in the sports facility. Ticket control is more precise because if the tickets are coded and issued in the specific name, all present in the sports facility can be easily identified by computer, and thus discourages uncontrolled intrusion into the venue. Also, because of preventing crowding of visitors in front of the entrance, sales of the tickets should be at least 10 meters away from the entrance.

Disadvantages of such entrances are problems with maintaining hygiene of floor under the gate and the possibility of injuring spectators in the case of uncontrolled access. Crowd control retracting belt stanchions and barriers are usually placed at the entrance of the facility to provide control at the entrance.

Horizontal movement in the corridor

Entering the sports facility before the event may last up to three hours, while the exit from the facility has to be completed within several dozen minutes. Therefore, "crowd pipeline" leading from the entrance to the passage towards seats and back should be defined and analysed in detail. (UEFA, 2011a,b,c)

Proper estimation of movement of users through the sports facility is very important for the design and control of corridors. It is essentially based on several elements:

1. *Entrances*. Width and type of entrances determine the number of visitors that can enter the facility in the unit of time. The desired period of filling and emptying the facility determine the number of entrances.

2. *Exits.* Doors must open in the direction of movement of visitors, i.e. outside. They can accept 40 to 60 visitors per minute in the unit of width (60 cm). Such experience shall determine the number of exits in relation to the desired time.

3. *Corridors and passages*. Their width is defined by regulation and they are changed during time.

4. *Areas of individual obstruction*. These are additional surfaces to existing corridors for movement, and they are for visitors to take a rest without preventing others from moving through the corridor.

Vertical movement in the corridor

This type of movement (stairs and ramps) is necessary, but it has to be used as little as possible. The speed of movement of a group on vertical routes is considerably smaller than in horizontal movement, and obstructions happen more often.

Stairs are the compact solution, but also a bigger source of danger than steep ramps. It is recommended that they are designed in pairs, with the biggest allowed inclination of 33°. At determining inclination, the most important role plays the relationship of height and width of stairs. Handgrips and the surface of stairs are very important because they have to prevent slipping and to be easy to maintenance as well.

Steep (inclined) ramps have the advantage of being simpler for movement than stairs, and the consequences of an injury are less dangerous than in case of a fall from stairs. If they are designed and constructed to have an adequate width and if the construction can support it, they can be used for vehicles as well. Their form can be circular or rectilinear. Handrails and finishing must be in line with the usage.

Escalators. Because of high price and costs of usage, they are rarely used in sports facilities.

Lifts. Individually, they are of small capacity and can be a source of danger in case of losing control over movement of visitors. In practice, they are used by VIP, for private use, by members of clubs or executives, but also by security, police, medical teams, media, persons with special needs etc.

CONCLUSION

Management of movement of visitors in a facility is of a great importance for a successful organization of a sporting event. The corridors must be defined from the entrance into the premises of the sports facility to the visitor's place on the stand. Depending on the position of a characteristic zone of a corridor, there is a logical line: the zone between the border of the plot and the facility, outer zone, inner zone, the zone of the stand. With a precise division of characteristic zones of movement of visitors and specification of needs within a zone, it is easy to organize safe and efficient movement towards and from the stands. According to inclination of the surface, communications can be grouped into horizontal and vertical. Each of the two listed groups has defined rules of design and maintenance. Entrances of the facility are equally important places on the way of a visitor toward the place on the stand. Depending on the technical solution that has been implemented, they have a defined capacity and it has to be taken into account

while designing the facility, but also while organizing the sports event. Together with the entrance for visitors, there are several entrances intended for specific groups in the facility, such as entrances for players, VIP, security, service, medical help, persons with spe-

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MANAGEMENT DER BEWEGUNG VON BESUCHERN IN SPORTOBJEKTEN

Zusammenfassung

Das Management der Bewegung von Besuchern in einem Objekt ist von großer Bedeutung für die erfolgreiche Organisierung eines Sportevents. Vom Eintritt der des Besuchers auf die Parzelle des Sportobjekts bis zu seinem Platz auf den Tribünen müssen die Korridore definiert sein. In Abhängigkeit von der Position wird der Korridor zusätzlich in logische Zonen eingeteilt: Zone zwischen der Grenze der Parzelle und des Objekts, äußere Zone, innere Zone, Zuschauerzone. Durch präzise Spezifizierung der Bedürfnisse innerhalb einer Zone wird auf einfache Weise eine sichere und effiziente Bewegung der Besucher organisiert. Die Kommunikationen können horizontal und vertikal sein. Jede der Gruppen hat vorgeschriebene Regeln für Gestaltung und Instandhaltung. In Abhängigkeit von der angewendeten technischen Lösung haben die Eingänge eine definierte Kapazität und dies muss bei der Organisierung eines Sportevents beachtet werden. Neben den Besuchereingängen gibt es noch eine große Anzahl an Eingängen, die für spezifische Gruppen bestimmt sind, wie zum Wetteiferer, VIP, Sicherheitsdienst, Service, ärztliche Hilfe, Medien, Personen mit besonderen Bedürfnissen usw. Das Management der Bewegung von Besuchern in einem Objekt muss Gegenstand einer sorgfältigen Analyse sein, weil es eine große Bedeutung für den allgemeinen Eindruck über die Qualität eines Sportobjekts trägt.

Schlüsselwörter: EINGÄNGE / KORRIDORE / SICHERHEIT DER BEWEGUNG / MANAGEMENT FÜR BEWEGUNG

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