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The history of civilisations and places conveys the importance of the role the culture of sport and a cultivated management of leisure play in the definition of the identity of peoples and communities. Elevating such realms to the status of cultural assets to be shared and enhanced by analysing the dynamics of transformation of the city and territory related to them is a sensible, necessary and ethically correct action. The context of European architecture shows an increasing number of plans that both transform existing facilities and create new ones with a defining and strategic role in the development of urban and landscape fabrics. Activating a basic and permanent theoretical discussion is a fundamental and strategic action for the credibility and professional values of a sector that powerfully conveys the need to update and retrain its technical, executive and managerial personnel through a renewed cultural approach. The goal of this book is promoting awareness about the design enhancement of sport infrastructures as collective assets capable of developing identity and citizenship, through the analysis of both physical and immaterial factors and of the personnel charged with their conception, construction and management. Within contemporary architecture, the design of facilities for sport practice provides an extraordinary opportunity for the adaptation and strategic re-evaluation of the environment and its paradigmatic places. At the same time, sport infrastructures provide a crucial opportunity for architectural, design and technological experimentation – exploring their core features and enhance their potential is the main goal of this book.



Emilio Faroldi

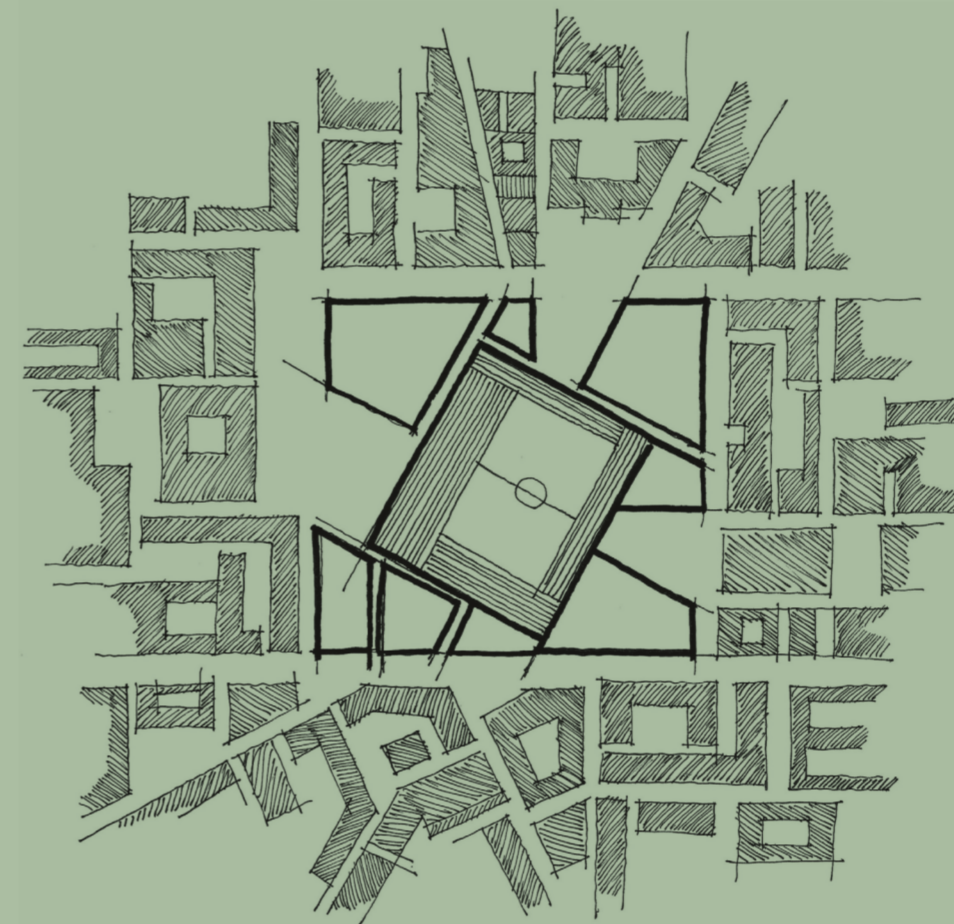
SPORT ARCHITECTURE



edited by Emilio Faroldi

SPORT ARCHITECTURE

Design Construction Management
of Sport Infrastructure



••••• LetteraVentidue

«Only one thing is more exciting than reading a book: writing it».

Emilio Faroldi, 1999

Since a book is a narrated architecture, it is always the result of a collective action. This book is the outcome of the teamwork of people who believe that architecture, any architecture, has a primarily social value. The more the programs it accommodates have a collective and educational value, the more such architecture becomes the primary form of connection between human beings and space. Sport architecture certainly belongs to such category.

In copertina:
Maria Pilar Vettori, Urban S-Composition, 2020

This book is for Luca
and his dreams.

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**Design Construction Management
of Sport Infrastructure**

Since a book is a narrated architecture, it is always the result of a collective action. This book is even more the outcome of the teamwork of people who believe that architecture, any architecture, has a primarily social value. The more the programs it accommodates have a collective and educational value, the more such architecture becomes the primary form of connection between human beings and space.

Sport architecture certainly belongs to such category.

The book – a collection of essays by researchers, academics and experts who believe in the value of sport and its infrastructure – reflects some of the lessons, seminars and workshops held over a decade within the *Design Construction Management of Sports Infrastructure* program organised within the final year of Politecnico di Milano's Architecture Degree. In particular, I am grateful to all the people who, in different ways and periods, contributed to the success of the teaching program, starting with the students and assistants who participated over the years. Besides the authors of the essays that compose the book, without whom it could not exist, my gratitude particularly goes to Davide Allegri, Dario Cea, Pietro Chierici, Maria Pilar Vettori who have always stood by me in this theoretical mission complemented by a prolific and exciting design activity that still goes on with vibrancy and continuity. Without them, I would have missed the stimuli and cultural insight concerning the underlying issue of this book. I also thank all the graduate students, now architects, who, over time, have decided to address issues and designs pertaining the discipline, in order to complete their educational path with dissertations about sports and the facilities designed to host them. In particular, I thank Silvia Battaglia who worked with dedication, competence and seriousness to organise the materials in the book.

I am also particularly grateful to my friend Michele Uva who, since 2001, has provided an innovative and pioneering contribution to my meditations and experiences about the complex management of the sports-football relationship, connected to places designed to host this sport, and to the architect/businessman Giovanni Valentini who helped redefine the design approach to this issue.

Finally, the book is designed as a knowledge platform for whoever intends to explore the design and management of sports infrastructures with awareness and a full grasp of the discipline, as well as for all the students of the I and II level Master in *Sport Architecture* formerly in *Design Construction Management of Sport Infrastructure* held at Politecnico di Milano.

Emilio Faroldi

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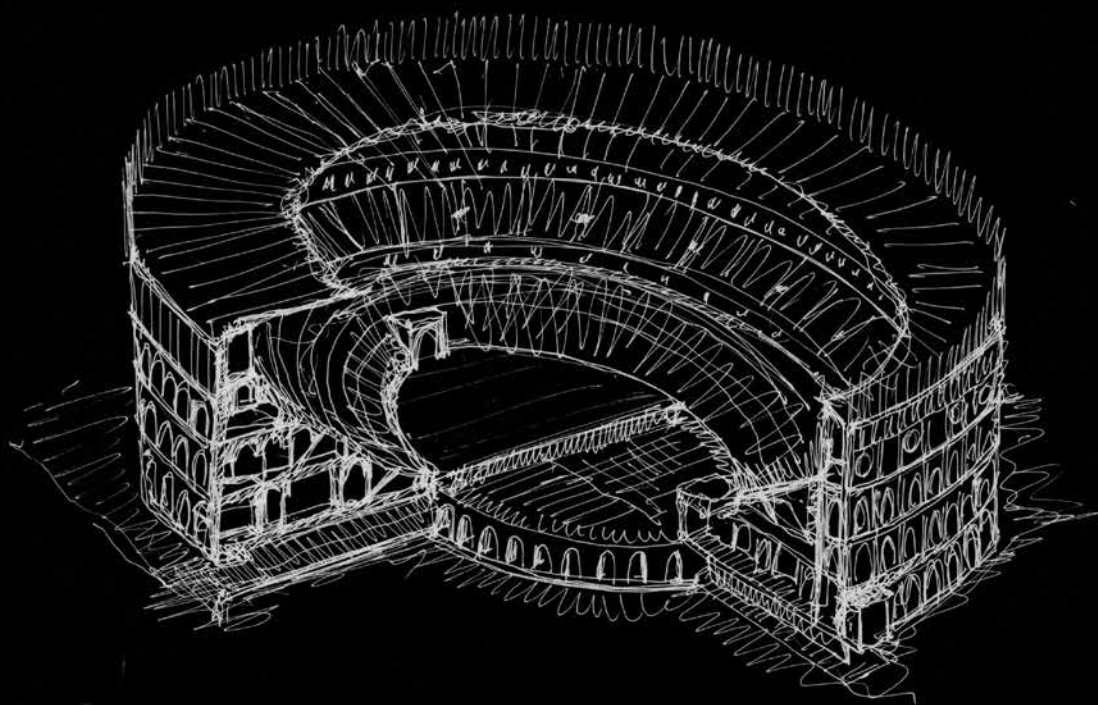
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Sport Infrastructure

Origin, evolution, transformation

by Emilio Faroldi



«For the first time in the history of humankind, at regular intervals and at fixed times, several millions of people sit down in front of their TV to watch and, in the fullest sense of the term, participate in the celebration of the same ritual».

Marc Augé, 1982

The sport infrastructure represents an important opportunity for architectural, design and technological experimentation – highlighting its potential is the main goal of this essay¹.

Exploring the paradigms of the design, construction and management of *sport architecture* by extracting their values in terms of innovation, multidisciplinary and inter-scalar approach, means pursuing an undoubtedly topical research branch and contributing to a critical dimension of the debate concerning the role such infrastructures play in the contemporary age, either in continuity and/or in discord with their history.

Their territorial and urban relevance suggests the adoption of a broad approach to this issue, unlike the no more tenable vision that used to consider stadiums merely as objects and in terms of their performance. Now, instead, it is necessary to extend such scope to the entire “process-project-product” realm by involving since the early explorations the management matrix indicators associated with the concepts of compatibility, functionality, maintainability, durability, usability, safety underlying a demonstrable assessment of the economic and financial feasibility extended to the entire lifecycle of the infrastructure.

The realm of environmental planning and the instrumental, regulatory and procedural framework represent, in complementarity with the functional and morphological-linguistic aspects, the cultural field within which the planning and construction of sport facilities develop themselves.

Similarly to the action of rehabilitation and enhancement of the built heritage, the integrated strategies of new construction applied to sport infrastructures define the realistic margin of critical, cultural and design exploration of the potential sport architecture can offer in terms of urban and social regeneration.

The actualisation of the urban space and the development of an organic system of public spaces functionally integrated with major sport events is a recent phenomenon that guarantees a certain success when developed in favourable and positive political and structural conditions.

The pioneering practices developed by some European countries since the

1980s demonstrate that such events only have a limited impact when they exclusively focus on physical and object planning. A now widespread approach, instead, considers them as the instruments of political planning. The latest Olympic Games (Barcelona 1992, Atlanta 1996, Sidney 2000, Athens 2004, London 2012); and of the World Expos of Seville 1992, Lisbon 1998, as well as the 2015 Expo held in Milan – an opportunity of revival and international rebranding for the city – are successful examples of this approach. In this perspective, urban landscape requires new and flexible organisational principles. Multifunctional facilities become new venues for urban life, capable of influencing the mobility patterns by attracting remarkable flows of citizens across multiple time segments.

New sport infrastructures play a role in this cultural context by stimulating a modern response that effectively combines functional, morphological, political, social and economic-financial issues.

Sport architecture, and its design, inevitably address the variety and ramification of the issues that embody the rethinking of collective spaces, their forms and paradigms. Today, designing a sport infrastructure means interacting with some precise variables besides taking care of its specific technical, functional, distributional and linguistic aspects. These include the rituality and symbolism this typology implies, the meaning of sport infrastructure as a place, the concepts of *sustainability* and *safety*.

Stadiums, and sport facilities in general, tend to interact with the city and territory as urban facts, "primary elements", "city parts"² – closely associated to the urban form and its evolutionary dynamics. This element, and the persistence of these building typologies' formal reasons described by De Finetti as «final and exemplary architectures, used for centuries on end, typical for their admirable harmony between necessity and form»³, provides an opportunity to review some periods in the history of anthropised territory and to propose some possible perspectives for the transformation such buildings can generate.

The stadium as a symbol of the sport infrastructure.

Origin, evolution and models

The origins of the stadium⁴ – here instrumentally considered as a primary paradigm of the sport infrastructure – coincide with the concept of sport practice associated with its role of theatre for sport events and not exclusively with the concept of leisure.

The terminological transition, during the Greek-Roman age, from its meaning as a unit of length⁵ to an *architectural type*, in turn associated to a particular kind of running race that took place on a specific length in ancient Greece⁶, occurred simultaneously with the functional transformations of this building.

Over time, stadiums incorporated particular performances that, over the centuries, provided and still provide the fundamental frame of its concept and design development. These invariant features, although adapted to the requirements of the different ages, characterise the *stadium type*.

In ancient Greece, the *Hippodrome* and the *Stadium* were the key architectural complements, associated by the urban layout to the systems of gymnasia where the population constantly and methodically practiced an athletic activity. Competitions and events, followed by an increasingly larger audience, required new and adequate facilities. In 180 BC, the stadium of Miletus, with a capacity of about 15,000, was an essential architecture comprising two long rectilinear stands facing each other with the arena at the centre.

The Flavian Amphitheatre in Rome was the symbol of the power of the Roman Empire, and the historical example of an architectural and organisational ability resulting from a variety of technical and distributional devices and from the innovative and original solutions provided to issues of visibility, access and exit of spectators. Designed to accommodate about 50,000 people, the huge arena featured an awning installed at the top of the building and operated by specific machinery that protected it against the weather. This demonstrates the fact that, even at the time, the standards of comfort and quality of vision of the show guaranteed to the audience were primary and widespread goals.

The very first facilities designed to host football games were still some urban areas. In Italy, a country with a long and established tradition of public games, several activities involving the use of balls, with well-known rules and roles, popular since the Early Middle Ages took place in urban squares and in the courtyards of noble palaces⁷.

The evolution of the game and its transition from "Florentine kick game" to the so-called "gioco del pallone"⁸, originally played in the courtyards of Renaissance palaces resulted in its relocation in larger venues such as urban squares also due to the violence of blows. Such relocation of sport practices from the walled spaces of palaces to the open-air venues of the city reflected more than the requirement for a more adequate facility for aerial play. It also reflected a process of "democratisation" that involved the game during the eighteenth century when, with the increase of attendance and the crowding of squares, the games became more frequent and crowded.

The *stadium-square* during the Enlightenment age became the focus of a debate about the educational function of the game as the main ground for the enactment of recreational activities and of popular sociality, versus the theatre as the primary symbol of aristocratic *loisir*⁹.

In the nineteenth century, the venue for football games underwent a radical and final transformation that triggered the modernisation of the

construction process of new and specific facilities. Problems of public order and safety and the awareness of the disruption such activity created for the urban population invited the establishment of new public facilities designed to accommodate growing interest from increasingly diversified users.

The nationwide emergence of the *sferisterio*¹⁰ in Italy during the nineteenth century provided an adequate response to the issues of safety that urban squares were unfit to guarantee. It also defined and codified football within the urban and social context in the Italian cities.

Among the main reasons for the widespread construction of *sferisterio* arenas, a primary role was the social function the game itself had in the organisation of pre-unification Italian states. As the official venues for football, they were fundamental aggregation hubs within the urban context.

A widespread building program for such facilities occurred precisely during the early decades of the nineteenth century, in a period of deep economic crisis for Italy. This highlights the important role both public institutions and the Papal State attributed to the *sferisterio*, considered as an opportunity for recreation and for keeping young people away from vice and discontent resulting from growing unemployment, the dreaded source of popular anxiety and torment.

Sferisterio arenas soon attracted large crowds, so much so that in 1786, the celebrated German writer Wolfgang Goethe, having participated in a football game in Verona, reported that between four and five thousand spectators attended the event. For example, the majestic and monumental *sferisterio* in Macerata accommodated between 2,000 and 3,000 people. Due to its remarkable capacity, the *sferisterio* may be rightfully considered as a sort of ancestor of modern football stadiums and, in general, of sport arenas, as it was one of the main and most crowded venues of urban social recreation of the time. Such facility was not exclusively devoted to *historical football* games – something different from modern football. At the same time, it was the venue for a variety of games and entertainments previously organised in urban squares¹¹.

The emerging concept of professionalism and the radical social metamorphosis of the game, along with the implicit transformations of the venues designed to accommodate it, amplified the evolutionary process started in the late eighteenth century that also marked the decline of historical football. There were many and complex reasons for this. The games became increasingly less frequent and *sferisterio* arenas ceased to be used to make room for new urban planning and social requirements triggered by the evolution of taste and lifestyle of the new century.

Their final act¹² would coincide with the emergence of a new phenomenon in England: *foot-ball*. At the time, football was played with the hands and was more similar to rugby – as such, it was the actual ancestor of

modern football. The dissemination of the sport effectively occurred in the Anglo-Saxon educational environment, namely schools and universities, so much so that it actually became one of the main distinctions and qualifications for the schools themselves, as it invited the investment of remarkable resources for the construction of modern sport facilities. The prestige of university institutions resulted from their sport achievements.

Large arenas and, in particular, contemporary football stadiums have their origins in the ascent of modern football¹³, in the early nineteenth century, mainly in the contexts of urbanised and economically developed English regions. Indeed, it was not popular in the rural and extra-urban areas and thrived instead in city contexts boosted by the economic impulse of the industrial revolution.

The facilities built within what many defined as the “first generation”¹⁴ of modern stadiums, based on the principles of industrial culture, have a *multi-functional* character resulting from the coexistence of multiple sport practices, or a *poly-functional* character with a monumentality associated to actual sport parks.

The emergence of the first *clubs*, established and attended by workers associations¹⁵, promoted the process of association of a place and its sport club with a district, a city or, more in general, with the very working-class culture that had generated them. Until the mid-1980s, English stadiums were mainly attended by the working class¹⁶. To get an idea of the interpenetration between football and working-class culture in England, think of the architecture of some stadiums that, through their forms, materials and specific technologies, evokes the image of industrial plants in stylistic and not just metaphoric terms.

Between 1880 and 1890, the improvement of living standards of the English working class, associated with the introduction of the concept of *leisure*, promoted the process of rooting of sport deep in collective imagination.

At the time, the general concept of stadium and of sport architecture in Europe still evoked a place modelled over the Napoleonic arenas built for civil and patriotic events.

In Italy, football was first played on parade grounds and hinterland *esplanades*. It was only since the late nineteenth century that emerged the use of velodromes through a process of adaptation. Between the early twentieth century and the post-WWI period, in Italy and in Europe stadium design was still inspired to classical, Greek-Roman models¹⁷ for the construction of monumental stadiums mainly used for athletics rather than football. Notable examples include the Stadio dei Marmi at the Foro Mussolini – now Foro Italico – in Rome, inaugurated on October 1932; or the facilities built for the fiftieth anniversary of the Unification of Italy.

The football stadium, instead, was not part of the repertory of “academic”

typologies yet¹⁸ and, consequently, had not overstepped the limit between *spontaneous action* and *codified action*. Only in the 1920s, would football stadiums actually begin to emerge with a process through which the technical question catalysed the design and constructional effort, nurtured by the Italian structural engineering school and by its main exponents.

Between the 1920s and 1930s, modernist philosophy and an attempt at freeing the linguistic repertoire from the codes of decorativism led the new "stadium" typology to be involved in some relevant episodes. The Colombes Stadium (1925), built for the 8th Olympic Games in Paris, the stadium of Florence (1929), the stadium of Vienna (1931) and the stadium of Turin (1933) are only some of the most relevant paradigms of a new generation of sport facilities involving a technical and constructional experimentation aimed at a linguistic and formal renewal.

In Italy, the first football stadium, promoted as a public initiative, was the Littoriale Stadium in Bologna¹⁹, the construction of which started in 1925 to be completed in May 1927. The Littoriale marks the beginning of a new season for Italian sport facilities²⁰. The years between 1926 and 1937 were an *epic* age for stadiums, built in a great number all over the country, similarly to what was happening in many other European countries²¹.

Even when invested of intense rhetorical or celebratory emphasis, the linguistic and morphological expressions applied to the stadium still convey mainly functional concerns: «a building that [...] for its function required a specialised architecture featuring its own constructional elements»²².

The stadiums of the following generation mostly feature radial layouts with full or partial reinforced concrete roofs. While their integration with the landscape, their roof's shape and the interface between technological systems and settlement typology were core concerns for architectural meditation, only few exponents of the specialised cultural debate actually addressed them²³.

Nonetheless, the design research conducted in Italy did provide an important benchmark for the design and construction of several sport facilities abroad. The deep transformations in construction and architectural culture during the post-war period, as well as the transition from traditional to modern construction, the technological innovations brought by modernisation, the dissemination of reinforced concrete technology, the renewal of building elements and materials promoted by industrialisation made Italian structural engineering a star in the international scene, and triggered a fruitful debate against an exclusively technological vision of innovation.

The Olympic Games hosted by *Rome, Tokyo e Mexico City* during the 1960s²⁴, and the economic development of the following decade promoted the adoption and inherent development of large reinforced concrete structures. Several sport and performance facilities, as well as infrastructural

works, reflected this trend with large roof spans and a most fortunate alliance between architecture and engineering.

The continuous thread of experimentation in Italy started, as early as 1929, with the construction of the City Stadium in Florence by Pier Luigi Nervi²⁵ who, along with Riccardo Morandi²⁶, worked on infrastructures and large-scale public works as original grounds for his innovative experimentation. In such context, sport architectures reacquire an essential role within the research about new building techniques as typological paradigms in which building and structure almost invariably coincide and, at the same time, similarly to the projects for highways, railways and gas stations, airports, supermarkets, parking areas, anticipate the interest for some typically modern places and spaces. These same places and spaces are main topics for the current socio-cultural debate and unavoidable issues for architectural design.

Besides the celebrated and significant role played by Pier Luigi Nervi²⁷ in this context, a few major masters of modern architecture such as Giuseppe Terragni, Le Corbusier, Oscar Niemeyer among others ventured, although infrequently in this realm, mostly through abstract sketches, perhaps produced with the awareness they would remain on paper²⁸.

During the years of the debate about the fate of cities and the articulation of their parts, stadiums ended up at the fringe of architectural research, and remained the domain of structural and engineering disciplines. Stadium architecture becomes an accessory to its mechanistic and purely functionalist nature.

«Oddly enough, the most popular and spectacular of games fails to offer an adequate image of itself to whom watches it in large stadiums or at home on TV in terms of its graphic and plastic-aesthetic quality». Vittoriano Viganò, who wrote these words, proposed a design program provocatively entitled "A design for the goal" within his educational activities at the Faculty of Architecture of Politecnico di Milano, in the late 1980s. A research about new signs for a game, football, still anchored to its traditional and unchangeable "environment"²⁹.

During the 1990s, Italy created an opportunity for an experimentation about the "stadium type", in particular on a now particularly topical design issue – the adaptation, expansion and modernisation of existing facilities³⁰, by highlighting the difficulty and criticality of the relationship between stadium and urban fabric in a both design-performance and management perspective.

As demonstrated by specialised literature, it was a wasted opportunity due to the inadequate design solutions adopted at the time, which fully reflected the flaws of Italian architectural design and, more importantly, to the political and strategic planning of an event, resulting in a marked gap between goals, available resources and ability to control complex systems.

Changes and conceptual refinements between functional hybridisations and semantic contaminations

The sociological debate considers the stadium as a ground for primary sociality used by a collectivity that exists and acts in other spaces of the city besides the facility. «For this social, cultural, and consequently territorial articulation, the football stadium is no longer an isolated building around which other buildings casually articulate themselves but an object of programmed reconfiguration coherent with the territory that can catalyse diversified social users with times and rules of use even quite different from each other. Not an object but a place: this is the paradigm»³¹.

Within the stadium, football, and sport, interprets and conveys, through its rites and unchangeable codes, the dramas, aspirations, repressions of a society increasingly suffering from an identity crisis.

The transformation of "sport theatres" in the early 1990s underlies social roots. While up until then the stadium had been a venue almost exclusively used by pure fans, who attended it in order to watch the game, now it represents a system of particularly complex and articulated functions and relations so that the sport and competition event remains in the background. Gives this situation, the stadium reacquires its meaning as a "building", or a complex element designed to host activities closely related to the requirements of the modern society.

Having lost its nature of mere "container" where "the mass releases its tensions", its design required and still requires deep and continuing changes in terms of concept, functions and performance, as it has to address the requirements of different groups of public and of a dynamic society in terms of its essence and habits. Across history, stadiums, and sport infrastructures in general, represented a place of aggregation devoted to a defined and limited timeframe. Now, the times and ways of being at and using such facilities, as well as the groups of users, have expanded considerably.

These facilities have become constantly accessible in terms of times and ways of use, and incorporate the activities that allow for their operation, thereby promoting a more intense action of socialisation and a correct use of leisure the post-industrial and post-modern society has achieved and tends to enhance.

For a long time now, stadiums have ceased to be merely stadiums. They are more than that, with all the potentials and criticalities such condition entails. This factor is radically transforming the cultural meaning of these buildings. It implies an articulated and multiple use, particularly by the groups of users who are not directly involved in sport events and rather pursue the new and diversified relational opportunities these facilities offer besides public utility services. As a result, they interpret the sport infrastructure as a fully-fledged contemporary urban block, the modern reinterpretation of well-established

and historicised aggregation models.

Some designs built over the last two decades promote socially relevant spaces and functions besides entertainment and leisure programs. This shows how the possibility to expand and renew the functional system of such massive and highly complex facilities is closely connected to the opportunity to improve spaces and services in a way that encourages the focus on the requirements and primary needs of a community. The stadiums recently built in England and Germany as some of the best examples in the world appear as global, radically modernised buildings when compared to similar designs built fifteen years ago.

The concern for safety, sustainable mobility, a responsible management of resources, the territorial marketing processes generated by the models of urban development that guide the interventions of spatial and functional reconfiguration of the facilities, currently actual *cultural infrastructures*, is supported by an entrepreneurial approach fueled by a pressing pursuit of economic opportunities.

Only a deep rethinking of the facility, based on the transition from a "control culture" to a "safety culture", for a long time recognised as an example of unwritten translation of the "prison" architecture, led to the replacement of the traditional building with the modern multifunctional stadiums, now proudly exhibited by English, Anglo-Saxon, European football clubs.

Recently, the concept of stadium has undergone a deep physical and symbolic modification. As a safe place, it now attracts new groups of users and increasingly emerges as a venue for urban sociality for families and their renewed requirements.

Understanding and exploring this change means studying the process that recently affected the realm of public spaces more in general.

The ways of experiencing space have undergone deep evolutions, also due to the propagation of new aggregation modes. There is still a significant influence of the way of living *outside* rather than *inside*, according to the logic of a public-private space *continuum* that blurs the boundaries between spaces of different nature.

Open and public spaces define and guide new residential models generated by the relevant role *strategic design* plays in the definition of public places, and in their resulting attraction on younger generations.

Our interpretation of phenomena changes, and in so doing influences the act of metabolising new space forms in terms of social attraction within environments such as shopping malls, multimedia libraries, media stores, clubs, gas stations, railway stations, airports and all those facilities that, like stadiums, hold new captivating forms of attraction on users.

As anthropic forms that place a high value on serving or general collective spaces, outer spaces convey and influence the residential models through

their own morphological identity. From this point of view, the new environments emerge as fully-fledged media that can captivate and attract the new customers of the architectural product.

Traditional or “closed” stadiums are normally conceived as “containers” of spectators, exclusively operating during the sport event through a direct space-temporal relationship. For years, they exclusively resulted in mono-functional buildings for temporary use. Their presence within the urban context failed to consolidate its image – to the contrary, their looming, oppressive and often devalued presence and their concentrated and fragmentary use often contributed to its degradation. The facility failed to generate services or benefits for residents – on the contrary, it resulted in discomfort associated to public disturbance, overcrowded parking areas, pollution and, obviously, vandalism. The traditional stadium provides no benefits to the city and only highlights the most ambiguous and gloomy aspects of its presence.

In spite of this, in the UK most stadiums were – and still are – located within residential districts, mostly built during the 1920s. Their renewal represents a momentous turning point for such contexts. Similarly, an “open” model of stadium necessitates an articulated and balanced design with an ability to consider the transition from the generic user-fan to a diversified range of new both social and time entities. The marked change in the structure of stadiums, and in the composition of football users, underpins a reconfiguration of the architecture-sport-culture relationship. Primarily, with the foundational intention of pursuing the elimination of *un-sport* support, associated with phenomena that damage the image of the club and its home. Secondly, through the replacement of the traditional *user-fan* with the new figure of *user-customer*.

The change in the composition of football crowds, resulting from the new concept of “total stadium”, is one of the unavoidable steps in the complex evolution of sport practice and implicitly of its associated venue over the last decade.

Today, stadiums, arenas, sport palaces emerge as urban infrastructures offering a higher potential in terms of usability, compatibility, adaptability and ability to generate attractive events for the entire city. In other words, actual flywheels for the concentration of catalysing activities capable of generating sustainable economic opportunities aimed at the feasibility of the interventions.

The building is increasingly an urban element – a facility designed, built and managed precisely for the new spectator-customer, in line with the main standards of comfort, quality and safety.

The renewed management culture associated to such facilities incorporates the role that new tools for the propagation and perception of performance

and sport events play within the football organisation structure. The emergence of the new media overturned the centrality of the stadium and necessitated its opening to outer systems and networks. Such process of de-contextualisation and globalisation of information generated a renewed relationship between sport infrastructure and city. The new facility acquires a role larger than that of the traditional model, as it represents an active element in the process of renewal and enhancement of the urban infrastructural system. The relationship between the city and the recently emerged "stadium market" inspired by shopping malls propelled a sort of overturning of the values at stake.

In the past, the market and the places for commercial exchange were public venues and their integration with other activities resulted from the dynamic typical of the urban system. When the new *shopping malls* emerged and thrived, the market became a sort of square, a "conditional-access *agora*" that mimics the city by reflecting an explicitly *artificial* interpretation. «Thus, we witness an evolution of the relationship between market and urban system whereby the latter operates a "selective imitation" of the former; an imitation also experienced through a particular symbolic contamination, a fusion between reality principle (transactional activity as resource supply) and pleasure principle (consumption as a pretext for a pleasurable experience)»³². Social requirement exceeds all this and focuses on the redesign of the sport facility as a key moment in the life of the city in terms of value of the activities organised and planned within the facility as well as of the resulting communication.

Multiple issues converge in sport infrastructures because they offer highly specialised, articulated and complex functional programs – hospitality, restaurants, spas, multiplexes and theatres, meeting centres, as well as the headquarters of public and cultural institutions. In other words, activities that effectively challenge the widespread idea of a marginalised and *dangerous place*, and instead project actual service and socialisation hubs. A noteworthy aspect is the changing idea the collectivity has of sport and all the activities aiming at nurturing physical and psychic well-being, and responding to marked enhancement of the pleasurable and socialising values of sport activities. Consequently, a sport facility necessarily emerges as a chameleon-like venue daily hosting a variety of activities traditionally established within the post-modern city. A container with a highly competitive *mass-media* potential also due to the relevant position it occupies within the city and the resulting social demand.

Such potential comes across on different levels. The facility may become a sponsorship vehicle for multinational corporations, or more simply, emerge as a recognisable aggregation space in its territory by enhancing the identity of a culturally homogeneous district. The diversification of activities is

pursuable through a requirement program aimed at guaranteeing a constant operation of the facility and its accessibility all day and all year long. Besides concurring remarkably to the regeneration of the physical and social surroundings of the building, such functional rhythms and articulation pursue the goal of reaching out to potential new users who can benefit from such differentiated accessibility. In other words, the facility becomes multi-functional and multi-time, in line with the modern usability trends in the emerging city.

Developing an economic performance as separated from the sport performance, and generating a new user base capable of interacting with the entertainment offer available in stadiums, means that in the future sport clubs will be able to manage their revenues independently from sport results and performances by investing in the promotion of service and real estate activities.

In line with their history, stadiums and sport infrastructures claim a specific role within society as they emerge as primary sites of urban centrality, effectively attracting users from different social and cultural groups in the name of a shared value – sport, or the fact of being part of a community – where technology and the architectural sign are at the service of an experience of cohesion and recognisability.

«From a cultural point of view, the aspect that most characterises a sport facility is the monumental role it plays within social imagination and therefore the social unconscious. Arenas and stadiums, like spas and swimming-pools, always represented and still represent a point of reference that far exceeds the mere functional program and pertains, instead, to the representation of the symbolic contents of the entire social and collective structure»³³. Sport facilities are increasingly emerging as changing systems. Firstly, by allowing access to multiple sections of the building, it is possible to increase its flexibility – therefore its adaptation to every single event – and, secondly, extend and differentiate its lifecycle. The influence of communication technologies, and their impact on the concept of space-time relationship, have become primary elements in modern life.

Therefore, since the early twenty-first century, such facilities have changed their configuration, also due to the constant emphasis on electronic billboards, multi-media entertainment areas and different seating solutions for each kind of ticket. The evolution sport infrastructures have experienced over the last decade is closely related to the changes their related functions have undergone concurrently.

Such transformations are mainly related to the *spectacularisation* of the event and to the new marketing strategies that guide the intention to market a territory, a system, and the districts that define it³⁴.

Sport infrastructure – paradigm of a complex planning process

In brief: sport infrastructures are a challenging opportunity to experiment on and integrate the different functional, morphological and technological components that characterise architectural production in recent years.

The main variables of the concept-design-construction relationship converge in these buildings with a high degree of specificity on a two-fold ground – *exogenous*, in terms of relationship with the surrounding context, its connections, accessibility, integration with the existing conditions, values of environmental impact; *endogenous*, in the aspects of architectural, structural, functional, distribution, system nature of the design and building event.

Two main lines are recognisable in the recent history of *modern stadium* architecture. One is “the challenge” of the major engineering work that prevails over other architectural values through symbolic, building and contextual solutions of high technological, often self-referential, value, in part with a future-related approach. The other approach is rather focused on local concerns and aims at interacting with a productive world and a language rooted in their relative contexts, all while expressing its “systemic” potentials through large-scale networks and relations that pursue new centralities.

The requirement of flexibility, often constrained by existing regulatory frameworks, provides a perspective for an optimised use of large-scale facilities potentially capable of addressing multiple, both programmed and unplanned needs also and particularly of a public nature³⁵.

The sport infrastructure has always provided an outlet and a shelter in case of dramatic and unplanned events, such as the evacuation of population following natural disasters, the relocation of refugees or illegal immigrants, the requirement of large venues in case of exceptional events. Such issues require the architectural culture to reclaim such «large-scale technical object»³⁶ and turn it into a valuable opportunity of interaction between design and construction world, thereby rejecting a cultural position that simplistically relegates *sport architecture* to a mere event theatre.

«Besides addressing a technical problem, a sport facility must be, at the same time, accessible even in functional and perceptive terms, and interact with the cultural and physical features of the site. In other words, a sport facility is an architecture and, consequently, its design must address at the same time cultural and aesthetic concerns. The solution to this kind of problem can only be a rapprochement with the skills traditionally associated to engineering. Constructive innovation and formal evolution are only two aspects of the overall response to the problem of building a sport facility»³⁷, in the attempt of reconquering the theme of stadiums to the cause of architecture. «In the common conscience, a stadium has, indeed, become a sort of fixed image. A little like a technical object, a tool or a bicycle, it apparently results

from simple, fixed and easily understandable inherent rules – capacity, distance, visibility, shape of the pitch and tracks. The rest is a matter pertaining the engineers who calculate, and often exhibit, structures, frames, powerful jumps, roofs as the only elements that allow the inventive abilities of design to emerge. The interiors similarly comprise spaces that merely provide the necessary service areas by exploiting the unfortunate triangular space underlying them. Such distributive and typological model can only offer few alternatives resulting in very few successful expressions within modern architecture – the stadium designed by Garnier in Lyon, Lindegrend's stadium in Helsinki, Nervi's stadium in Florence, and few other examples. The rest usually reflects a solid triumphalist professionalism, often tinted with a governmental rhetoric but almost never with an architectural intention»³⁸. Sport infrastructures provide a real opportunity for the architectural and urban planning discipline to address complex issues pertaining to tradition with the goal of reclaiming the meaning of architecture and bring it back at the centre of the collective need for transformation. At the same time, this would save architects from the danger of playing a role of "cultural organisers" rather than that of intellectuals devoted to the development of methods and tools inherent to their discipline.

Notes

The quotation at the beginning of the text is from Augé M., 1982, «Football. De l'histoire sociale à l'anthropologie religieuse» in *Le Débat*, n. 19, pp. 59-67.

1. This text is loosely based on Faroldi E., 2017, «Le infrastrutture culturali. Architetture e tecnologie emergenti per lo sviluppo territoriale», in Faroldi E., Allegrì D., Chierici P., Vettori M.P., *Progettare uno stadio. Architetture e tecnologie per la costruzione e gestione del territorio*, Maggioli, Santarcangelo di Romagna, revised, extended and updated with reference to the evolution of the theoretical debate about this issue over the last few years.

2. «[...] By architecture of the city we mean two different things: first, the city seen as a gigantic manmade object, a work of engineering and architecture that is large and complex and growing over time; second, certain more limited but still crucial aspects of the city, namely urban artifacts, which like the city itself are characterized by their own history and thus by their own form» (Rossi A., 1982, *The Architecture of the City*, The MIT Press, Cambridge, Massachusetts, and London, England).

3. De Finetti G., 1933, *Stadi. Esempi, Tendenze, Progetti*, Milan.

4. «Stadium: Lat. stadium from the Gr. stádion (...) Enclosure that combines broad space for athletic games and other exhibitions with large seating capacity for spectators. The name derives from the Greek unit of measurement, the stade, the distance covered in the original Greek foot-races (about 600 feet [170 metres]). The course for the footrace in the ancient Olympic games at Olympia was exactly a stade in length, and the word for the unit of measurement became transferred first to the footrace and then to the place in which the race was run. The first Greek stadiums were long and narrow, in the shape of a U or a horseshoe. The design of the Greek stadium was taken over and improved upon by the Romans, who built two types of stadium: the circus and the amphitheatre» (<https://www.britannica.com/technology/stadium#ref100143>).

5. Approximately 177 metres in the Attic system and about 185 metres in the Alexandrine system. Such difference results from the different descriptions made by Polybius and Strabo.

6. The oldest known stadium is the Stadium of Olympia, in the western part of the Peloponnese in Greece, where the Olympic Games of antiquity were held from 776 BC.

7. The most famous among these games was the one practiced, ever since the early fifteenth century, in several cities in Tuscany. Particularly popular in Florence during the sixteenth and seventeenth centuries, it was called "Florentine kick game". Each team had 27 players, laid out on three lines, who fought for the ball with hands and feet, in order to get the ball into the opponents' goal. Unlike hurling, Florentine kick ball did not have rural origins – it originated in the urban areas of Italian cities among aristocrats. Its main features were the feudal-style detailed choreography and a chivalric code of values.

8. Played during the fifteenth century, it was originally a court game: two teams of three-four players exchanged the ball on a rectangular pitch divided by a string.

9. Because, as argued by the French intellectual Jean Jacques Rousseau, if the idea of festival was traditionally conceived as a blurring of the separation between actors and spectators, now it translated in the idea and in the practice of public powers. The ball game effectively projected the recreational activity as an event that overcame social inequalities, so that some lower classes could compete on an equal footing with their masters.

10. The *sferisterio* (from the Latin *sphaeristerium*, in turn from the Greek σφαιριστήριον, *sphairisterion*) or *sferodromo* (from the Greek σφαῖρα, *sferos*, ball, and δρόμος, *dromos*, run) is a sport facility devoted to various ball games apart from football. In many countries where ball games are played, the definitions of *sferisterio* change but the meaning of the term always describes the venue devoted to such games.

11. Before and after the matches, there were equestrian shows, launches of hot air balloons, raffles and lotteries, opera recitals and circus performances. There were often political upheavals, like in Rimini, on September 1845, when half the population gathered in the *sferisterio* in order to conspire against the government – a fact that testifies to the social importance of this venue, selected for its high capacity.

12. The decline started in the late nineteenth century, when the growing popularity of cycling certainly helped divert football fans' interest towards this sport.

13. Football originated in England, at first as a game practiced by aristocrats. Its popularity,

though, emerged during the Victorian era, when the sport was advertised as conducive to social health and solidarity.

14. Frank B. Lowe, a designer with the London branch of the HOK Sport design practice, divided modern stadiums into three categories. See Nixdorf S., 2005, «The Composition of Stadiums. Between Multifunctionality and Reduction», in *Detail*, n. 9, pp. 916-925.

15. «Sheffield United, for example, was established by a group of craftsmen, knife makers who worked in small workshops in Sheffield, an origin that reflects their nickname, "The Blades"; West Ham United was established by a group of workers at the Thames Iron Works and the Manchester United by workers at the Lancashire and Yorkshire railways» (Taylor I., 1971, «"Football Mad". A Speculative Sociology of Soccer Hooliganism», in Dunning E., *The Sociology of Sport*, Cass, London).

16. Even the professional figure of the football player was traditionally considered as "working-class". The player was classified as a manual labourer who used his feet as working tool. Lanfranchi P., 1998, «I Calciatori e il People's Game», in De Biasi R., ed., *You'll Never Walk Alone. Il Mito del Tifo Inglese*, ShaKe, Milan.

17. The reconstruction of the Panathenaic Stadium of Athens for the first modern Olympic Games of 1896 would strengthen such trend during the following decades; see De Finetti G., 1933, *Stadi. Esempi, Tendenze, Progetti*, Milan.

18. Del Fante L., 1988, «Lo stadio Comunale di Firenze di Pier Luigi Nervi», in Aa.Vv., *Tre architetture degli anni Trenta a Firenze*, Fondazione Callisto Pontello, Florence.

19. Designed by the engineer Costanzini and by the architect Giulio Ulisse Arata, the stadium, featuring a clearly Fascist image but a style inspired to Imperial Rome, differed from previous designs in that it was a multifunctional facility built in the suburbs with a football pitch surrounded by a six-lane running track. Surrounded by two swimming pools and four tennis courts, it was an actual *sport citadel*.

20. Up until that time, Genoa was one of the few Italian cities with a football stadium, built in 1911.

21. Koenig G.K., 1968, *Architettura in Toscana 1931-1968*, Florence.

22. Giulio Ulisse Arata wrote this statement for the presentation of his project for the new stadium of Rome in Arata G.U., 1942, *Costruzioni e progetti; con alcune note sull'urbanistica e sulla conservazione dei monumenti*, Milan, p. XVI. Besides the Maratona Tower of the stadium in Bologna, completed in 1928, and the Stadium of the One Thousand (the nickname of the new stadium of Rome) in 1932, Arata also worked for the Ansaldo company at the project for a covered stadium in the early 1940s, a sort of circular building with a metal and glass frame featuring a markedly modernist style.

23. In Italy, there was a cultural change: after a period entirely dominated by private initiative, there was an important phenomenon of municipalisation of stadiums. In 1930, there were as many as 2,405 sport grounds built and managed by city administrations: the 100x60 pitches were up to FIFA standards and adequate to host international competitions. Some of the main Italian stadiums, still operating today, although modernised, date back to that period: Arena Garibaldi in Pisa, 1929; Giovanni Berta in Florence, 1932; La Favorita in Palermo, 1932; Littorio in Trieste, 1932; Benito Mussolini in Turin, 1933; Cibali in Catania, 1935; Menti in Vicenza, 1937; the stadium in via Vesuvio in Naples, 1930.

24. Rome 1960, Tokyo 1964, Mexico City 1968.

25. The construction of stadiums, one of the most explicit manifestations of the close connection between aesthetics and structure, reflects the paradigmatic expression of Nervi's poetics. An engineer and builder, Pier Luigi Nervi designed and built several sport facilities. Besides the Giovanni Berta later Artemio Franchi Stadium in Florence (1929-1932, expanded by Nervi himself in 1951) and the Flaminio Stadium in Rome (built between 1957 and 1959 for the 1960 Olympic Games), the Nervi archive holds documents for six more projects in Italy (a project for the stands of a stadium for 100,000 spectators in Rome, 1935; the project for the Palme Stadium at the Favorita in Palermo, 1954; the Taormina stadium, built between 1955 and 1959; the expansion of the National Stadium in Rome, built between 1956 and 1958; the project for the reinforced concrete stands of the sports ground in Cuneo and the project for the contract competition for the construction of the city stadium of Salerno), as well as four projects abroad (the vaulted field house for the Dartmouth College in Hanover, New Hampshire, 1960-1961; a project for the Swindon Stadium, UK, 1963; a project for a 150,000 seats stadium in Rio de

- Janeiro, 1964, and a project for an entirely covered stadium at the Kuwait Sport Centre, 1968).
- 26.** During the 1960s, Riccardo Morandi also designed two sport facilities: a 100,000 seats stadium for the Citadel of Sports in Teheran (with A. Zavitteri) and a proposal for the Olympic Stadium in Munich.
- 27.** Nervi's architecture, based on the aesthetics of structures and developed according to calculation diagrams, clearly emerges here too – from the solutions adopted for the Stadium of Florence in 1930, to the studies for the Great Stadium of Rome in 1935, to the Stadium of Taormina in 1956. All of these designs feature different solutions also dictated by the different conditions Nervi had to address. However, in spite of the differences typical of each disciplinary field, a constant element clearly recurs in all his stadium projects: the pursuit of a combination between aesthetic sensibility and statics. In these "essential" works, this combination is all the more evident. We find it in the helicoidal stairs of the Florence stadium, in the canopy of the Flaminio stadium in Rome, in the studies for the 100,000 seats stadium when Nervi designed the second level of the overhanging stands, or again in the vault of the field house for the Dartmouth College. Another factor, less evident but still recurring in these works, is the constant study for structural prefabrication, which allowed for a faster and less expensive construction of structural solutions than the traditional building procedure. At the same time, they express a constant innovation in Pier Luigi Nervi's design and building activity.
- 28.** At the end of his brief career, Giuseppe Terragni (1904-1943) worked at the project for a partially covered stadium (attributed to Enrico Mantero from 1941): the few drawings (5 sketches on paper) show a careful approach to integration and orientation as well as some hints at building solutions for the partial roof. See Mantero E., 1983, *Giuseppe Terragni e la città del razionalismo italiano*, Dedalo, Bari, pp. 212-213.
- 29.** Viganò's proposal for the introduction of technological and perceptive innovation and for a more cultivated participation emerged from the Department of Design of the Faculty of Architecture of Politecnico di Milano (Professors Vittoriano Viganò, Valsecchi, Mascazzini, Occhini, Palavezzati). «[...] However, what is required in such a context of deficiency, which is all the more evident given the equally evident potential offered by game and popularity? What is required is a study that, precisely by exploring such data and potential, opens to a more evocative and even more structurally innovative football design in figurative and spatial terms. [...] Is this a theme for architecture? It certainly is because, with all its particularity, it implies an intent, requires a critical approach, introduces unexpected and plausible proposals for renewal and improvement through an aesthetic contribution. In other words, it is a solid prerequisite for an experience of imagination and graphic restitution». (Viganò V., 1988, «Un Disegno per il goal. Progetti e avventure creative per un gioco del calcio più...», in *T-SPORT*, n. 8-9, August-September, pp. 581-595).
- 30.** Ten of the twelve stadiums involved in the 1990 World Cup were existing facilities modernised for the occasion.
- 31.** Faroldi E., 2016, «Un luogo chiamato stadio», in Marchesi A., *Un luogo chiamato stadio. I teatri dello sport tra divertimento, aspetti sociali, tecnologia e business*, Maggioli, Santarcangelo di Romagna, p. 36.
- 32.** Magnier A., Russo P., *Sociologia dei sistemi urbani*, Mulino, Bologna, 2002, p. 235.
- 33.** Nardi G., 1990, «La tecnica nell'architettura per lo sport: note intorno all'auspicata fine di un culto monumentale», in Aa.Vv., *Impianti sportivi. Parchi e giardini*, Electa, Milan, p. 53.
- 34.** «Territorial marketing is an expression that may have at least three different meanings – promotion of a territory, and its characters and perspectives [...]; finalisation of territorial and urban policies [...]; overall organisation of administrative procedures based on a tighter focus on the clients of the local system product» (Schiaffonati F. et al., 2005, *Marketing Territoriale. Piano, azioni e progetti nel contesto mantovano*, Clup, Milan, p. 17).
- 35.** On this issue, see the research conducted by Sonja Dümpelmann on how sport facilities have changed and shaped the form of natural and urban landscapes and how, conversely, technological and urban evolution has changed sport facilities. Dümpelmann S., 2018, «Big sport for big landscape», in *Topscape Il progetto del paesaggio contemporaneo*, n. 31, pp. 49-53.
- 36.** Gregotti V., 1990, *Cinque Dialoghi necessari*, Quaderni di Lotus, Electa, Milan, p. 7.
- 37.** Campioli A., 1990, «L'innovazione tecnica nella costruzione degli impianti sportivi», in Aa.Vv., *Impianti sportivi. Parchi e giardini*, Electa, Milan, p. 67.
- 38.** Gregotti, 1990, *op. cit.*, p. 27.