

Emilio Faroldi (1961), architect. is Full Professor at Politecnico di Milano. Designer and awards winner, his works have been published in the main architecture magazines. Among the areas of interest as designer and urban planner, stands out the sports architecture for which he has developed various researches, projects and buildings. He authored several publications and for over a decade has chaired and coordinated the degree courses in Scienze dell'architettura and Progettazione dell'architettura at Politecnico di Milano. Currently, he is Editor in Chief of the TECHNE Journal of Technology for Architecture and Environment, and Director of the I and II level Master in Sport Architecture formerly Master in Design Construction Management of Sport Infrastructure. Professor of the International Academy of Architecture, since January 2017 he has been Vice Rector of Politecnico di Milano.

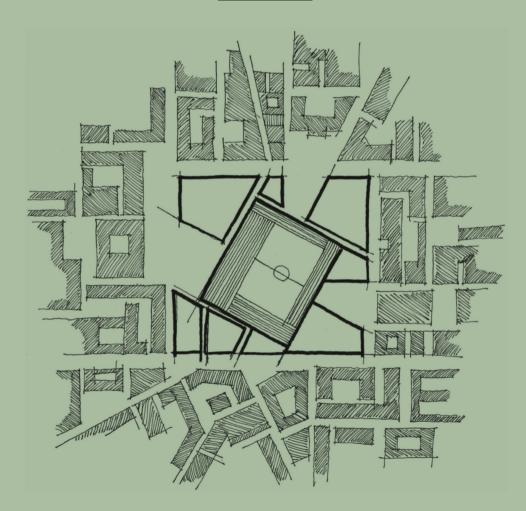
The history of civilisations and places conveys the importance of the role the culture of sport and a cultivated management of leisure play in the definition of the identity of peoples and communities. Elevating such realms to the status of cultural assets to be shared and enhanced by analysing the dynamics 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.



edited by Emilio Faroldi

SPORT ARCHITECTURE

Design Construction Management of Sport Infrastructure





«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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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.

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Prologue

Sport Architecture

Design Construction Management

In the history of civilisations, the meaning of sport and its venues is a fundamental element of intellectual manifestation and representation that effectively reflects the importance the culture of sport and the cultivated management of leisure have had in the definition of the identity of peoples. There was no age when entire communities did not use sport activity, and more in general ludic-recreational activity, in order to stage either material or immaterial iconic manifestations of their own identity.

The relationship between such activities and the definition of the venues designed to host them within anthropised contexts represents the barometer of the cultural expression and intimate soul of a collectivity. Such spaces structure themselves starting from the *genius loci* existing within the memorial structure of their communities that, as such, project such places to identify eloquent and evocative realms of the anthropological experience, representations of material and identity culture that impress a symbolic imprint in the surrounding territory. It is important to remark how, during the evolution of the history of architecture, sport venues always had the distinctive character Norberg-Schulz also identified in *existential space*, or the realm that effectively embraces the fundamental relations among human beings, environment and landscape. The relationship between sport and culture remains as easily recognisable as it was two millennia ago, and is so unchanged in any realm of contemporary society that it often affects its preferences and costumes.

Consider the role sport architecture played in the foundation of Western civilisations, from ancient Greece to Rome – those architectures were the metaphors of the evolution of building techniques, of socio-political organisation, of the urban planning vision of a civilisation and of the cultural supremacy of a cultural group over the others.

In Greece, sport venues, along with the delicate as much as complex orography of the territory, helped to establish a coherent and seamless land-scape system within which the consistency of symbolic, cultural, political and physical aims of spaces is clearly perceivable. In Rome, the "functionalist" and urban imprint of large containers of crowds is still visible, for example in the *Amphitheatrum Flavium*, or in the "insertion" of the Stadium of Domitian within the dense urban fabric – one of the most extraordinary squares created over a succession of historical layers.

The infrastructural meaning of sport architectures has become stronger since the twentieth century in coincidence with the emergence of *modern sports*, the mass diffusion of which implied a concurrent requirement for adequate sport venues.

At the same time, sport competition, often a metaphor of political and military competition, has its highest expression in the organisation of the great sport events in the early twentieth century – veritable physical and media showcases of the new modern and society and of mass consumption.

Consider the infrastructural works promoted between the 1920s and 1940s in Italy, or the organisation of the Berlin Olympic Games of 1936 in Nazi Germany; or even, although founded on different cultural principles, the building program implemented for the 1960 Olympic Games in Rome where the extraordinary structural gestures designed by Pier Luigi Nervi still represent recognisable signs permeating the urban landscape. As paradigms of physically tangible infrastructure, permeated with powerful symbolic messages, they were designed to represent political, cultural, social meanings due to their particular status as major objects at the urban scale, as such capable of amplifying the power and effectiveness of communication.

Since ancient times, sport infrastructure has also provided an excellent ground for the experimentation of innovative techniques and building systems designed to address the size of such buildings and the issue of extraordinary spans. As preferred opportunities for technical research, sport venues have historically represented a "pioneering" engineering approach in the application of experimental systems, especially studied and eventually reproduced with industrial technologies.

It was, however, at a relatively recent time, since the 1990s, that sport buildings fully acquired their status as infrastructure, thereby entering the descriptive palimpsest of the contemporary city. Fans started the genetic mutation that would turn them into "customers", thereby upturning and shattering the relationship between sport club and spectators. Clubs choose their head-quarters as the very first asset and foundation of stable and economically sustainable projects in the medium-long term and thus increasingly try to dissociate themselves from the sport performance. The "house-stadium" becomes a veritable hub designed to provide customised and flexible services to a generic larger audience, which now exceeds the world of "loyal fans" to conquer a global community.

In the contemporary age, with the process of dematerialisation of information and its easy socialisation, major sport events become mass-media models of extraordinary social-cultural value on a global scale.

A new generation of sport infrastructure projects an iconic value for the new millennium: containers with values in terms of symbols and media image that exceed those of the content. New "museums" of the contemporary age and hyper-technological symbols of our society. A further element is the emergence of an increasing and permeating "culture of sustainability" that prizes the ecological paradigm as a guiding principle for any anthropic transformation. In the context of sport venues, this culture translates into paradigms of virtuous behaviours aiming at wellness and physical health. In such socio-cultural context, the major events organised between the late 1990s and early 2000s – summer and winter Olympic Games, World and European Football Championships, World Swimming Championships – represent

actual testing grounds for research and innovation on multiple levels: from the most strictly technological and productive level, to the economical-financial and social-urban planning levels. Hosting nations try to outdo each other to "showcase" their technological, economic and political power similarly to what happened for the great world exhibitions in the early twentieth century. A common element emerges in such examples whose genesis is rooted in ancient times – their immanent infrastructural character, which creates a continuous flow between memory and present. Like other building works such as bridges, roads, aqueducts, the Flavian Amphitheatre and its towering arcades that refer in their sign and structural concept to a common building tradition is the ultimate urban and multifunctional infrastructure, a hub for social gathering and an organisational element of the city. The careful intersections between the natural orography of Greek landscape and the steps of theatres or Olympic stadia similarly represent refined harbingers of modern territorial infrastructure works.

In synergy with morphological aspects, different meanings of a more "immaterial" nature make the definition of *sport infrastructure* even more meaningful and effective: from the symbols underlying the representations to the artistic, narrative and generally cultural references expressed by the buildings themselves.

Today, writing about or discussing of "sport buildings" or "sport architectures" in exclusively morpho-typological terms or in terms of requirements and performance amounts to a sterile and narrow-minded exercise. The themes and disciplinary realms directly affected by everything that turns around the world of sport, leisure, healthy living are multiple and multi-faceted.

The sport facility in its terminological meaning refers to a self-referential object of which one assesses the performance qualities as intrinsic and dissociated from its context.

The concept of sport infrastructure, instead, expresses qualities pertaining to its being an interactive hub in a given territory, of which it becomes an engine and dynamic expression.

In this sense, the word infrastructure, traditionally associated to mobility, should be considered in its material meaning as an element of connection between urban functions and its being an icon of the relations established between such functions. Sport infrastructure identifies the most effective social, functional, morphological glue combining the multiple and complex relationships operating within the urban organism, and as such represents a constantly changing dynamic system.

Unlike the words sport "facility" or "installation", a sport "infrastructure", as such not referable to an exclusive typology of buildings, fully expresses the role these architectures have acquired in the evolutionary dynamics that structure the contemporary city.

Considering sport buildings and architectures as equivalent to infrastructures in the traditional meaning means placing them within the complexity of organisation of the contemporary space around us.

The word infrastructure evokes the dynamic concept of "integrating" (or integrated), from the Latin completing, adding something in order to obtain a complete and functioning system. Adding the word "sport" means, from the semantic and operational point of view, defining a new approach aimed at reaching a global rethinking of the role of sport facilities within society. It also means integrating and connecting currently isolated spaces and places, defining new settlement systems, re-ordering scattered fragments of the city, creating new experience levels.

What emerges is the intention to define an overarching organisation and the functional performance of a *city system*, in turn recognisable for its high architectural quality: an overall vision where design and process, form and function, construction and familiarity of places coalesce in one system characterised by hierarchies and, as a consequence, by infrastructuring actions. Thought, research and development trends point towards an integration of architecture and urban planning in order to achieve a high quality and environmentally sustainable planning. At a policy level, this approach translates into processes that promote sustainable urban development – *Horizon 2020*, *Urbact*, *SI-Drive Europe*, *Transit* – and encourage cooperation among sectorial policies that decisively affect the territory.

In some respects, the concept of infrastructure applied to sport venues opposes a "thematised" city shape hinging on the model of centre as a unique and catalysing commercial park. Sport infrastructure, on the contrary, establishes strategic clusters in order to manage the complexity of changes through connected poles of polycentric attraction that structure a system. In this sense, sport emerges as a variable of even physical sharing and inclusion of the city and its new use opportunities.

The evolution and complexity of architectural reality and its management, economic and social processes has promoted the propagation of a new generation of multi-functional facilities designed to guarantee environmental quality, safety and multi-functionality. Especially when associated to major size, the concept of sport infrastructure is increasingly comparable to that of a complex system in the multiple meaning of places for well-being, performing arts, social activity and production within the larger scenario of the "panoramas of the contemporary".

In its updated cultural character, the football stadium implies an additional complexity, in terms of technology, product and process, underlying the integrated processes that, throughout the concept- programming-design-construction-management phase, affect all the scales of intervention and thereby extend their influence to the entire lifecycle of the building.

As the established paradigms of the current concept-construction scenario, multiscalarity and multidisciplinarity are unavoidable references for an innovative design approach.

The articulation of processes is particularly complex in the realm of sport infrastructure due to the multiplicity and type of involved stakeholders whose interests are often divergent in legal, social and cultural terms. The social, cultural, identity, environmental, public health and political consensus issues involved in this process typically promote integrated forms of public-private partnership.

This scenario necessarily relies on a constant update and refinement of increasingly sophisticated instruments of integrated governance and complex processes of data gathering, management and sharing.

The variety of players involved in the transformations that affect entire communities at the territorial scale has implied a rethinking of the *nodes* and *networks* of decision processes thereby introducing new statutes that regulate the planning decisions, in parallel with the emergence of advanced technologies for an ever-faster analysis, organisation and sharing of an increasingly large amount of information.

In an age when resources are increasingly scarce, the *management phase*, when ideally considered within the circular scheme of a building's lifecycle, inevitably becomes a priority since the beginning of the concept process, as it already contains in embryo the project's critical elements.

Such reversed approach, appears even more important in the case of sport infrastructure where the actual and fixed management costs are on average higher than in other architectural typologies and technological systems often play a primary role. An integrated *multi-sectorial and multi-disciplinary* management, never considered as an independent phase separated from the entire design process but as an engine of that very process, is necessary for all of such reasons.

Traditionally considered as opportunities for technological innovation, sport installations have even emerged as the symbols of an actual architectural *New Deal* during the last few years. Up until the 1990s, sport installations typically reflected a mono-functionalist approach and a marked indifference to language and landscape. Now, the close connection among sport, leisure, wellbeing and environmental quality, and the substantial "opening" of the infrastructure to the context and its social communities through the extensive use of the media and the network of social relations a sports and entertainment hub may activate, have encouraged a radical rethinking of these architectures.

Over the last three decades, a new generation of advanced infrastructure has emerged in which the system and technological components have grown increasingly complex and dense and as equally important as strictly

functional and structural values. Technological flexibility, safety, enjoyment, sustainability and comfort are the parameters of a radically new cultural approach and as such implies new and higher levels of technological, socio-functional and urban resilience.

The "sport system" – especially the football system, given the scope of this phenomenon –currently highlights a structural debt towards its competing systems: such criticality threatens to manifest itself in negative expressions in sport, property, financial, and legal terms. The renovation of the sport world must necessarily come about through interventions aimed at providing a system of modern facilities, in line with the most current concepts of enjoyment, safety and environmental compatibility for the public and the citizenship. While insights and suggestions from the international scene are welcome, a specifically Italian model must emerge in order to address the territorial, social and cultural requirements by nurturing organisational solutions aimed at guaranteeing economic productivity, visibility and political satisfaction to the implementing bodies in the respect of history but with an eye to the future.

In light of such considerations, the complex and multifaceted scene of sport infrastructure clearly expresses the need to provide an adequate role for high-level education as a necessary investment and the foundation, in a virtuous chain reaction, of the policies of enhancement and renovation of sport facilities through a systemic vision of disciplinary contributions. Such actions must point to the propagation of the adequate knowledge and skills in order to address the processes of promotion and management of the venues for sport, social activities and leisure in an effective and proactive way.

The specialisation and complexification of such processes seems increasingly evident within the dynamics that affect the entire sport industry in all its declinations. Consequently, the requirement for multi-disciplinary operatives who can interact with multiple public and private stakeholders and players of the governance processes involved becomes increasingly urgent. This perspective frames the multiple actions involving second- and third-level university education undertaken by Politecnico di Milano in close synergy with and relevance to the institutional system¹.

In particular, these include the I and II level Master in *Sport Architecture* formerly Master in *Design Construction Management of Sport Infrastructure*, established by Politecnico di Milano in cooperation with the main stakeholders of the Italian sport system: FIGC, Sport e Salute Spa (formerly CONI Servizi Spa), Istituto per il Credito Sportivo (ICS) and Lega Serie A. Due to quality of the study plan and the profile of the speakers involved, the Master is undoubtedly the main educational platform in Italy for sport installations, as well as one of the most appreciated educational programs within the international scene of educational offers on sport infrastructure.

Its aim is training high-level professionals who can successfully operate in the realm of concept, programming, design, construction and management of sport infrastructure, according to transversal and cross-disciplinary logics and skills and in alignment with the recent legislative measures in this area. The curriculum offers the opportunity to acquire all the technical and management skills required to define a highly specialised professional who can easily fit into the multiple economic-productive, institutional and professional sectors connected to the macro area of sport facilities. The Master addresses the issues connected to the sport-infrastructural area by bringing the organisational and management aspect to the centre of the design-concept process as the first and foremost element for an informed and sustainable development of any infrastructural development and enhancement process.

The program comprises three macro modules: design, construction and management. Each includes thematic under-modules and different teaching methods: lectures, seminars and monographic meetings, focus-groups, visits and study trips, applicative project-work, intensive courses during the program (at the FIGC Federal Technical Centre in Coverciano, the main training facility for national football teams, and at the CONI technical training centre "Giulio Onesti" in Rome), final apprenticeships within companies, partners, major architectural and engineering firms, sport institutions.

The program's faculty includes high-level representatives of the university, research and professional worlds operating within the design and management of sport infrastructure and economic and financial management applied to the disciplinary sector of reference. The modules established within the curriculum are directly under the responsibility of the institutions involved. Sport e Salute Spa (formerly CONI Servizi Spa) is responsible for the design and management of small- and medium-sized facilities hosting all kinds of sports besides football. FIGC organises the "management" module focusing on the principles of management and project financing applied to the sport-infrastructural sector by exploring the main national and international case histories and best practices. The "management" module is also aimed at training a new kind of professional for sport facilities – the "stadium manager". The module is available as a stand-alone educational offer even for humanities and economic schools' graduates.

In short, this book is intended as a small but significant contribution to knowledge in this cultural context: the students, young architects, engineers, designers of today will be the designers of tomorrow, through the establishment of a network of mutually interactive and complementary professional figures who will effectively respond to the challenges proposed by the current and future scenario.

The world of infrastructure, in the wider sense of the word, and of sport infrastructure, in particular, requires the establishment of design, construction and management rules and models capable of encouraging believable forms of both cultural and economic investment.

The evolutionary dynamic of the contemporary city suggests, along with the values of solidarity, culture, knowledge and innovation, also the principles deriving from the coexistence of multiple and qualitative elements: hospitality, multi-directionality of purposes, richness of diversity, interdependence, interpretation of the context as the foundations of contemporary knowledge.

Cities and territories are firmly anchored to the society that lives and uses them, by enjoying their spaces and enhancing their resources through layered processes and dynamics. For this reason, sport infrastructure should be viewed as a widespread territorial product, an element related to others within a multilayered system, potentially able to contribute actively to the enhancement of a specific space. In fact, recent architectures structure and de-structure the environment by activating processes connected to different territorial dimensions.

The places of contemporary use of the new functions expressed by the society increasingly incorporate as their model the archetype of sports and events venues that materialise the time of social gathering, of ludic moments and of the hybridisation of the spheres of action by confirming the transversal meaning that consumption, recreation, leisure, communication, information, tourism and sport acquire today.

Through its spaces, sport plays a fundamental role as social activator, capable of incorporating and interpreting effectively the requirements of the collectivity, by highlighting the relation with its reality, by enhancing the perceived value and the level of enjoyment of the facility itself.

The sport architectures of the future will aspire to become sport infrastructure for the *Community*, conceived, designed and built in a converging and inclusive, innovative and multimedia form. At the same time, they will carry a meaningful architectural sign of a local and at the same time global matrix, capable of affirming itself at the same time as an experiential place and a territorial icon. Moreover, the design realm will have to pursue constantly new formulas designed to conceive increasingly less rigid and extremely flexible structures even in the medium and long term.

The issue of resilience, applied to complex sport infrastructure, reveals the lack of organic and systemic investigations on this matter. However, the social, economic and environmental implications such architectures have at the urban and territorial scale mean that this sector has strategic importance, when and if it is viewed in synergy with the practices of sport, health and wellbeing.

Symmetrically, one can recognise innovative trends that introduce a wide-spread focus on the issues of the urban and social resilience of these infrastructures. If, on one side, existing facilities appear clearly inadequate to adaptation due to their high morpho-typological rigidity, on the other side, they substantially channel the strategies of planning and transformation of places on a wide scale. Emerging suggestions and design trends encourage the adoption of new approaches aimed at modularity and dimensional flexibility so that these facilities may change their original programs in case of changing scenarios.

Therefore, sport would become a promoter of attractive hubs that cluster and catalyse human and economic resources united by the same spirit of cultivated use of time and emotions, as well as able to transform the established catchment areas by transforming traditional geographic and geopolitical boundaries into actual districts based on the values, rules and rites that sport has always dictated.

Notes

1. The range of educational initiatives undertaken by Politecnico di Milano include: the Football Stadiums. Design, Construction, Management Continuing Education program, Centro per la Formazione Permanente del Politecnico di Milano, Lega Calcio, Intesa BCI, Milan, academic year 2000/2001 (director: Emilio Faroldi); the Design Construction Management of Sport Infrastructure program, active since the academic year 2007-2008 within the Master's Degree in Architecture of Politecnico di Milano (Professor Emilio Faroldi); the activation, during the academic year 2017-2018, of a I and II level Master in Sport Architecture formerly Master in Design Construction Management of Sport Infrastructure, involving the main institutions of sport governance (Sport e Salute Spa, formerly CONI Servizi Spa, Federazione Italiana Giuoco Calcio, Istituto per il Credito Sportivo, Coni Lombardia, Lega Serie A). Again, in a synergic-implementing frame of educational initiatives, Politecnico di Milano coordinated for four years the Kick-off event organised by FIGC, the Stadiums and sport infrastructures multi-disciplinary panel, by helping with the preparation of FIGC development programs on this issue.