



## **The new stadium culture**

### Architectural mesh as multimodal cladding for sport and commerce

A good ten years ago, people still associated sport with stale-smelling gymnasiums, advertising campaigns propagated mass sports with slogans like "Keep fit!", and the sports stadium was still seen as an explosive stronghold of the underprivileged classes. In the meantime, that has all changed. Sport is lifestyle, spectacle, a stage on which to see and to be seen. Multimillion-dollar mega-events like the Olympics, the Soccer World Cup and European Cup or Formula One racing are colossal media sensations which underline the fact that sport is a communicative meeting point, a positive image carrier and a lucrative investment.

### **Bread and circus**

The forerunners of this new sports culture already existed in classical times. Today's wellness trend is a continuation of the bathhouse culture of the Islamic Hammam, the Greek gymnasium and the Roman baths. In addition to the need for bodily cleanliness, such ultra-luxurious facilities also fulfilled the desire for spiritual purification. This was where profound dialogues took place, where politics and commerce were negotiated.

A second type of sports structure, the stadium, is also part of this tradition. Originally conceived as a racing track with two parallel straights and a curve, by Roman times the stadium had already developed into an elliptical arena for fights with animals and gladiators, for small staged battles or even naval engagements. For the latter, the arena was flooded to accommodate battleships. This was made possible by a complicated underground



labyrinth of corridors and storage chambers. The "false floor" also housed the cages for the animals and the gladiators. In contrast to classic amphitheatres, in this type of stadium the seating rows surrounded the whole of the central arena – at first using natural slopes, later by means of grandstands with up to four tiers roofed with mobile canvas sunscreens. In this way, the Colloseum in Rome could accommodate approx. 50,000 spectators – a capacity which many stadiums today still cannot match.

### **Complex demands**

In today's sports business the mechanisms are analogous: sport still sells. In the last ten years, this has also characterized the development away from monotonous concrete bowls towards multifunctional event locations which draw in crowds of fans, today for the Champions League Cup, tomorrow for a performance of Verdi's "Aida", and the day after that for ice hockey, basketball or a show jumping tournament. As a result, the demands on stadium design have become far more complex. Not only extreme functional flexibility of the arena itself is decisive, but also the service which is provided to the customers: from easy access through public transport and sufficient parking spaces, spacious service areas for gastronomy, box offices and fanshops, right through to complete roofing over of all seats, the addition of boxes and business areas, or big-screen replays of crucial moments in the game during the breaks.

In addition to these direct demands on the modern sports stadium, a range of additional requirements have also developed to allow the operator to fully exploit the stadium as a multifunctional source of income. In particular, the multi-purpose use of boxes and business areas for conferences, exhibitions and product launches helps to ensure that the capacity of the stadium is fully exploited.



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## **Opening new dimensions with stainless steel wire meshes**

### **The initial project: Cycling Arena and Indoor Swimming Pool, Berlin**

Since the beginning of the 90s, the world's leading technical weaving mill for metallic meshes, GKD – Gebrüder Kufferath AG, has been accompanying this development intensively and making substantial contributions to it. The Dueren-based company's involvement in sports arena architecture began in 1992 with Dominique Perrault and the new construction of the Cycling Arena and Indoor Swimming Pool in Berlin, commissioned for the Olympic Games 2000. The French architect's concept envisaged the embedding of the two halls like amphitheatres in an inner-city parkscape with 450 fruit trees. This internationally acclaimed project marked a major change of direction in sports and leisure architecture: away from large hall structure and towards landscape architecture; away from monumental edifices and towards filigree roof structures. The primary focus of attention for the architect was the roof surface of around 22,000 square meters. Perrault gave the following reasons for his design: "The essence of this poetic and abstract solution is that only the metallic roofs are visible. They seem to float, rising up only one meter out of the ground. This unique architectural element reflects the colours of the time of day and the season of the year: during daylight, the sky is reflected in the huge, flat surfaces like water in a lake; at night, the surfaces emanate a myriad of reflected lights, creating a magical atmosphere." As well as the aesthetic qualities of stainless steel wire mesh, its sustainable functional properties were also decisive in the selection of this material. The roof coverings made of the GKD stainless steel mesh type Futura 240 are resistant to rust and maintenance-free. Access for cleaning purposes is no problem, as they can be walked on without losing their form. There is also no problem with access to skylights and ventilation flaps.



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### **Stade de France in Paris**

GKD was also involved in the next milestone in the field of sports stadium architecture. In 1995, a representative setting, "un lieu mythique", was created in France for the Soccer World Cup 1998 in the form of the Stade de France in Paris. The architects Claude Costantini, Michel Macary, Michel Regembal and Ayméric Zublena designed a gigantic arena with a capacity of 80,000 spectators and clad in a mantle of stainless steel wire meshes with various degrees of transparency which shimmers from afar in the sun or under spotlights. Located between a canal, a railway line and the Boulevard Périphérique, the stadium was built as a structural aid measure on a derelict industrial site in St. Denis. To allow the greatest possible range of sports to be catered for, an elliptical arena was created with three tiers of grandstands. Depending on the particular sport, the lowest grandstand can be extended or retracted on air cushions, bringing the spectators close to the action on the central field for soccer or rugby games, or moving back to reveal the surrounding athletics track. In addition, the stadium also has a congress and exhibition centre and about 6,000 square meters of office and shop space. This first major exponent of the latest type of stadium machinery with its comprehensive answer to a wide range of requirements is both a pioneer project and a figurehead – not least thanks to the use of the GKD stainless steel mesh type Omega 1520. As well as functioning as a highly stable and weatherproof safety ballustrading, the wire mesh also gives the arena an air of optical lightness through the skillfully accentuated interplay between opacity and transparency.



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### **Camel race track Nad al-Sheba in Dubai**

Similar design accents were set at the Millennium Racetrack Nad al-Sheba in Dubai in 1999, where GKD stainless steel mesh type Tigris was used for the staircase cladding of the grandstand. The constantly changing optical effect, depending on the angle of view, between glittering opaqueness and transparency gives the metallic mesh an unadorned beauty which holds the attention even of passers-by with ever new and surprising perspectives. At the same time, it fulfils the highest safety requirements – a decisive advantage in the eyes of the architects at the Engineer's Office when they were selecting from the available working materials.

### **Estadio Santiago Bernabéu in Madrid**

Since 2002, the Estadio Santiago Bernabéu in Madrid has been refurbished into a nine-star stadium, one of the best and most comfortable stadiums in the world. This stadium represents the continuation of the new generation of soccer stadiums, started with the Stade de France, which because of the increasing medialization of sports must meet a variety of new demands. When finished, it will provide seats for about 80,000 spectators, all of them covered seats with cushions and radiator heating. The essential cornerstone for the planning by Estudio Carlos Lamela was the roofing over of the eastern stand, in which the press and media facilities were also housed. Since this is the side of the stadium where the main entrance is located, several aesthetic and functional advantages of stainless steel wire mesh could be exploited in the cladding of the façade. With a total surface area of 3,300 square meters, the façade acts like a curtain which screens off the game going on behind it while at the same time allowing a glimpse behind the scenes. Through the large surface area of its 7 mm wide stainless steel spirals, the spiral mesh type Escale 7 x 1 combines this visual dynamism with an astounding three-dimensional grace and



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extraordinary reflective brilliance. This makes it possible to use the stadium's façade as a projection screen with long-range visibility for advertising banners and sponsors' clips. Using three 18,000 Lumen projectors installed on adjacent buildings, stills and advertising spots are projected from a distance of 100 meters as 30 x 10 meter images. Because the whole façade is tilted by 32 degrees, the adverts are just as visible to the football fans queueing to enter as they are to passers-by.

### **Ski stadium at Östersund**

The ski stadium in Östersund, Sweden, is an extraordinary cross-country arena with 7 kilometers of roller-ski track, 29 kilometers of illuminated cross-country trails, 89 kilometers of prepared trails and 12 kilometers of dog resp. sleigh trails. In addition, numerous new buildings were created to allow the venue to also cater for major events in world skiing. Östersund can therefore be used all year round as a training and competition facility. In the middle of the arena, a 53 meter high warm water tank was erected which is also used to provide long-distance heating for the City of Östersund some two kilometers away. Because of its exposed location, a restaurant and lookout platform were installed in the upper part of the tower. For the façade, the architects' office Openeye and Claes-Göran Andersson decided on the GKD stainless steel mesh type Tigris. Here, too, the characteristic of the metallic mesh, its alternation between transparency and highly reflective opacity depending on the angle at which light falls on it, was a decisive argument for the choice of material, so that the façade cladding could also be used as a projection screen.

### **Formula One: Shanghai International Circuit**

Shanghai, China's richest and largest city, has acquired the technically most sophisticated and so far most expensive racing track in the world in



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the form of the Shanghai International Circuit, which was put into operation in September, 2004. As well as the innovation involved in the technical construction of the circuit, the architecture of this tempodrome of the 21st century is also truly remarkable. Its symbolism pays extensive tribute to the traditional culture of the Far East. The racing track is shaped like the Chinese character "shang", which stands for "ascent" or "success". The buildings, too, are emblematic of Chinese history, nature and technology. The building complex of pit area with control tower and main grandstand with media centre forms the shape of two gates – thus symbolizing Shanghai's significance as a gateway to the world. The roofs of the secondary grandstands on opposite sides of the circuit are shaped like lotus leaves and symbolize the indispensable, protective harmony of nature and technology. In spite of all these allusions to Chinese culture, Shanghai's latest prestige object is characterized by dynamic structural forms and high-tech materials like shiny aluminium, glass and stainless steel. To clad the grandstands, the Aachen-based architect Hermann Tilke was looking for a material, permeable to light and air, which in addition to fulfilling fire prevention regulations would also provide a high degree of optical aesthetics. The result was that GKD was commissioned to produce the rear and side cladding of the main grandstand façade and the rear cladding of the two secondary grandstands with the GKD wire mesh type Tigris. Since the only way to access the grandstands is from these sides, it is the textile structure of the shimmering Tigris mesh which characterizes the representative main entrance. The fact that the material is resistant to vandalism and easy to keep clean guarantees the longterm attractiveness of the entrance.



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### **Wankdorf Stadium, Berne**

With the opening of the new Stade de Suisse Wankdorf in Berne in summer 2005, Switzerland is entering a new dimension of stadium architecture, a new "Miracle of Berne". Here, the plans of the team of architects Luscher, Schwaar and Rebmann have been implemented to create a stadium with a versatile range of potential use as a venue for sports, culture and commerce. 32,000 spectators in covered grandstands can follow the games of the Young Boys Berne or their national team. 16 catering stands and a fan shop await fans with money to spend. But even above and beyond sport, the new Wankdorf Stadium promises to be a magnet. The shopping market located under the field and the stands reckons with up to 15,000 customers per day. Visitors will find a culinary variety to meet all tastes in the various restaurants which together provide seats for over 2,000 guests. Boxes with 8 to 24 seats for approx. 200 persons in all are available to companies. For the façade of this spectacular new construction, the architects decided on various GKD stainless steel wire meshes of the group Omega. Again, besides the aesthetic beauty of the material, it was the functional advantages of the wire mesh which influenced their choice. In addition to its suitability as a projection screen, in this case it was its aerodynamic properties which were particularly convincing. Since the stadium is situated with its eastern side facing the prevailing wind, two tasks had to be fulfilled which are, in essence, mutually exclusive. On the one hand, the playing field turf should be well ventilated; on the other hand, there should be no draughts in the stadium itself. Wind-tunnel tests showed that the small mesh apertures of the wire mesh made both effects possible at the same time.



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### **Managing change through competence**

With technically innovative and aesthetically outstanding solutions, GKD – Gebrüder Kufferath AG has made substantial contributions to the character of the enormous change which sport and its architecture have been going through. But this transformation is not just a matter of technology or architecture: the very concept of the sports stadium itself is changing. The stadium is being rediscovered as a place where record sports achievements and commercial culture, enjoyment and profit merge: bread and circus in a new outfit – as shown in 2006 at the Ascot Racecourse, the world's most famous racecourse.

Creative technological leadership has always been and will continue to be the driving force of the company. GKD – Gebr. Kufferath AG comprises three autonomous business units of the company division WORLD WIDE WEAVE – SOLID WEAVE for filtration and separation media, WEAVE IN MOTION for conveyor and process belt technology and CREATIVE WEAVE metallic fabrics for architecture and design – all of which contribute to the company's global success. The second company division CAPITAL EQUIPMENT focuses on filtration and separation equipment. Many of today's important wire mesh weaves were originally developed by GKD. Around 50% of the total turnover of this producer of high-quality metallic meshes is generated through products launched within the last four years. With around 610 employees worldwide, 405 of them in Düren, Germany, GKD has an annual turnover of about 72 million Euro (2006). And GKD also strives to be close to its market partners in a geographical sense, too, with seven works – two in Germany, the others in England, Ireland, Spain, the USA and South Africa, branches in France, China and Dubai as well as agents all over the world.

16.298 characters incl. spaces



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## **GKD – WORLD WIDE WEAVE**

As a privately owned technical weaver, GKD - Gebr. Kufferath AG is the world market leader in metal, synthetic and spiral mesh solutions. Four independent business divisions bundle their expertise under one roof: Industrial Mesh (woven metal mesh and filter solutions), Process Belts (belts made of mesh and spirals), Architectural meshes (façades, safety and interior design made of metal fabrics) and Mediamesh® (Transparent media façades). With its headquarter in Germany and five other facilities in the US, South Africa, China, India and Chile – as well as its branches in France, Spain, Dubai and worldwide representatives, GKD is close to markets anywhere in the world.

### **For more information:**

GKD – GEBR. KUFFERATH AG  
Metallweberstraße 46  
D-52353 Düren  
Tel.: +49 (0) 2421 / 803-0  
Fax: +49 (0) 2421 / 803-211  
E-Mail: [metalfabrics@gkd.de](mailto:metalfabrics@gkd.de)  
[www.gkd.de](http://www.gkd.de)

### **Please send a reprint to:**

impetus.PR  
Ursula Herrling-Tusch  
Charlottenburger Allee 27-29  
D-52068 Aachen  
Tel.: +49 (0) 241 / 189 25-10  
Fax: +49 (0) 241 / 189 25-29  
E-Mail: [herrling-tusch@impetus-pr.de](mailto:herrling-tusch@impetus-pr.de)

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Picture 1: Cycling Arena and Indoor Swimming Pool in Berlin



Picture 2: Shanghai International Circuit



Picture 3: Stade de France



Picture 4: Stade de France

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### **impetus.PR**

Agentur für Corporate Communications GmbH

Ursula Herrling-Tusch  
Charlottenburger Allee 27-29  
D-52068 Aachen  
Tel: +49 [0] 241 / 1 89 25-10  
Fax: +49 [0] 241 / 1 89 25-29  
E-Mail: herrling-tusch@impetus-pr.de

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Picture 5: Camel race track Nad el Sheba



Picture 6: Estadio Bernabéu - Escale 7x 1



Picture 7 and 8: Football stadium of Real Madrid



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Pictures 5-8 © GKD

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### **impetus.PR**

Agentur für Corporate Communications GmbH

Ursula Herrling-Tusch  
Charlottenburger Allee 27-29  
D-52068 Aachen  
Tel: +49 [0] 241 / 1 89 25-10  
Fax: +49 [0] 241 / 1 89 25-29  
E-Mail: herrling-tusch@impetus-pr.de