

BUROHAPPOLD
ENGINEERING

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1. EXECUTIVE SUMMARY



Executive summary

Oliver Plunkett, Managing Director, BuroHappold Engineering, Middle East

Sport matters. By bringing people together, it strengthens their sense of cultural identity. And sporting success not only delivers a powerful feel-good factor. It can also significantly boost a nation's standing on the world stage.

For the nations of the Middle East, sport offers particularly exciting opportunities – and not just as a vehicle for global recognition. By focusing the energies of the region's rapidly growing and overwhelmingly youthful populations, it can help turn those energies into dynamic drivers of the common good.

Harnessing the young's enthusiasm for sport can encourage them (and their parents) to be fitter and healthier, for example. And sport can bring economic benefits as well. There are trickle-down effects when people gather to play football or work out. Local businesses benefit, and as they expand so too could local job opportunities.

All these potential advantages hinge, of course, on the availability of the right venues: stadia fit for purposes that transcend their immediate value as sporting icons.

Creating such stadia is what this paper is all about. It reflects both the breadth of our global sector knowledge, and the depth of our regional respect and local understanding.

BuroHappold has been in the Middle East for over 40 years. The buildings and infrastructure we've delivered are as much our legacy as they are yours: international icons that enhance local life. We offer this paper as a further contribution to that legacy.



2. GLOBAL ASPIRATIONS, LOCAL NEEDS



Global aspirations, local needs

A new sports stadium is a prestige project: the ticket to international recognition as a venue for elite sporting events. But what happens to such an iconic facility when the crowds go home? Who continues to benefit from it? How does it pay for itself in the long run?

These questions have challenged sports authorities the world over. And in the Middle East, which is striving to balance global aspirations with increasingly urgent local needs, they loom large indeed.

There's no shortage of existing stadia in the region. Yet many, built decades ago, are showing their age, and not surprisingly, they're no longer pulling people in. Attendance at football matches is falling, for example, despite the rising popularity of the game; some clubs have even resorted to offering fans prizes if they turn up¹.

We believe that the Middle East's sports authorities could make much more of these existing facilities. Indeed, by repurposing what they already have, they could create world-class sporting venues that also better serve their own populations.

Attendance at football matches is falling, for example, despite the rising popularity of the game; some clubs have even resorted to offering fans prizes if they turn up.



1 <http://www.wsj.com/articles/SB10001424127887324266904578456741356678544>

3. REFURBISH, OR BUILD NEW?



Refurbish, or build new?

The decision to refurbish or build new depends, of course, on many factors, including the extent and quality of what's to be retained, the need or otherwise for business continuity, and the management of risk associated with refurbishment. The piecemeal and often protracted redevelopment of many stadia in the UK, for instance, has typically taken longer, cost more, and delivered less improvement in business performance than the construction of completely new facilities.

However, even in such cases, refurbishments have still supported the sporting and business continuity essential for the day-to-day operation of most professional clubs. Phased construction has also helped spread the cost of reconstruction over several seasons. And when the reconfigured venue includes significant pieces of the original construction, there can be substantial cost and program benefits associated with refurbishing rather than rebuilding.

The repurposing of the former Olympic Stadium 2012, for example, retained the iconic lighting fixtures that had illuminated the original games and, as Colin Naish, London Legacy Development

Corporation Stadium Executive Director explains, "interim events have kept the legacy alive" (see *Transformation of the former London 2012 Olympic Stadium: Serving sport and the community*, page 16).

The retention of an existing historic venue – if only in part – could have strong cultural significance for both sport and communities. Furthermore, when integrated with local infrastructure, self-sustaining stadia can contribute to job creation, urban regeneration and socio-economic development.

In a region with some of the highest obesity rates in the world², stadia with easily accessible recreational sports facilities could even make a significant contribution to the improvement of public health.

OBESITY STATISTICS IN THE MIDDLE EAST AND NORTH AFRICA

	% of obese men	% of obese women
Turkey	16.5%	29.4%
Israel	15.4%	15.9%
Jordan	---	26.3%
Lebanon	36.3%	38.3%
Palestinian territories	23.9%	42.8%
Bahrain	23.3%	34.1%
Kuwait	27.5%	29.9%
Oman	16.7%	23.8%
Qatar	34.6%	45.3%
Saudi Arabia	26.4%	44.0%
UAE	17.1%	31.4%
Iran	9.1%	19.2%
Algeria	8.8%	21.4%
Egypt	---	46.6%
Morocco	8.2%	21.7%
Tunisia	6.7%	22.7%

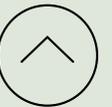
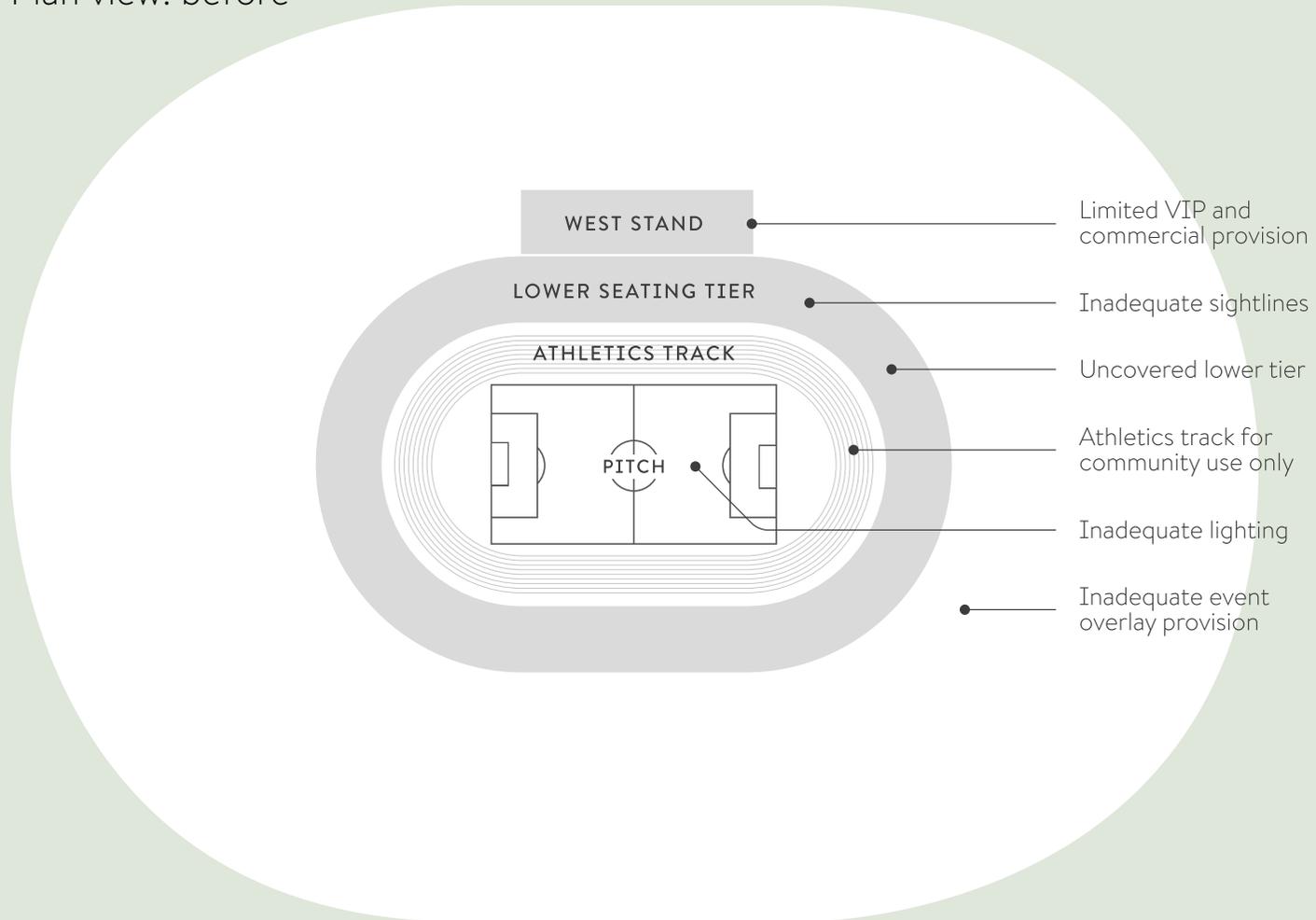
https://en.wikipedia.org/wiki/Obesity_in_the_Middle_East_and_North_Africa#By_percentage



2 <http://nuviun.com/content/global-incidence-of-obesity-skyrockets-highest-rate-in-the-middle-east>

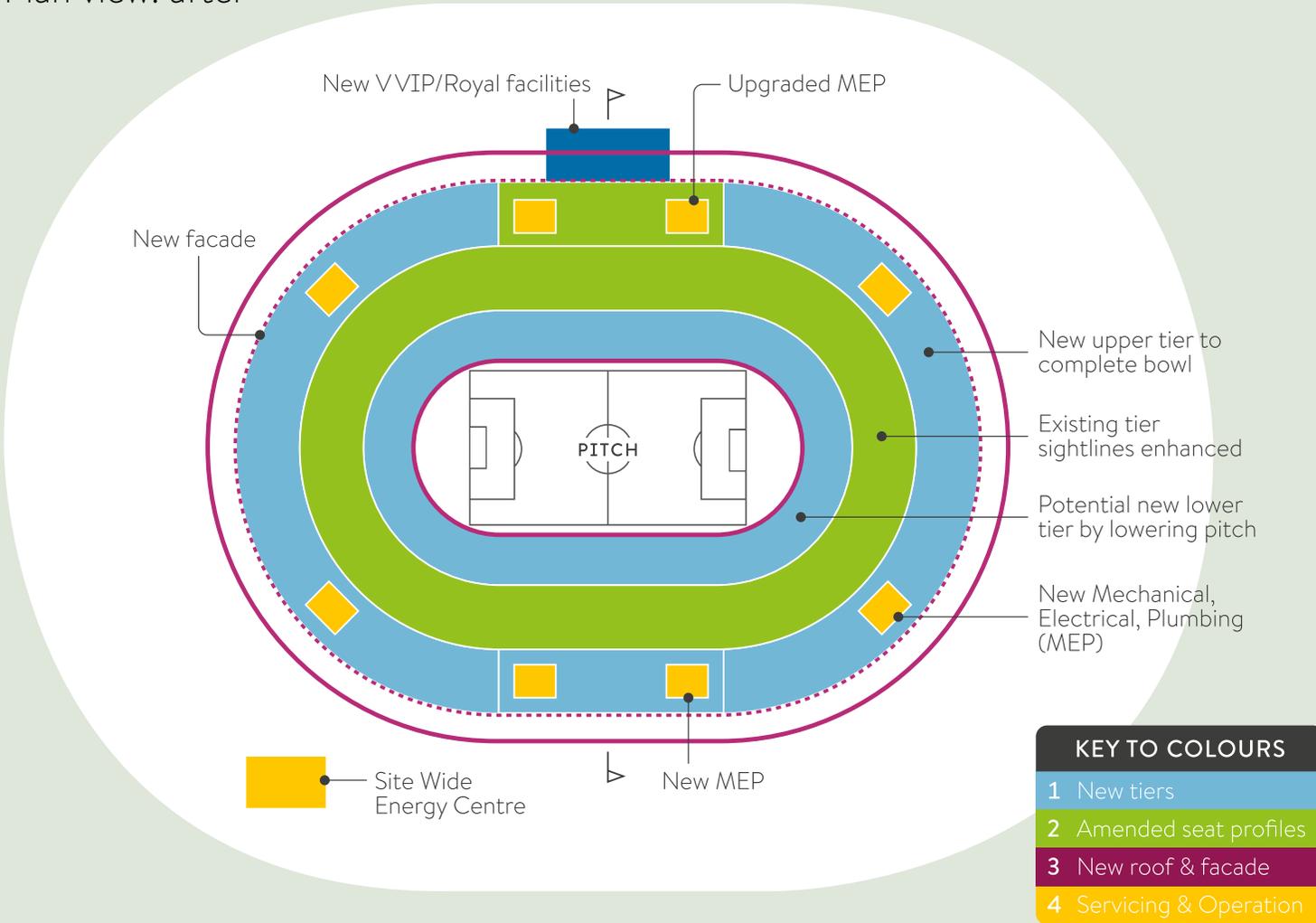
Zoning of Stadium Services

Plan view: before



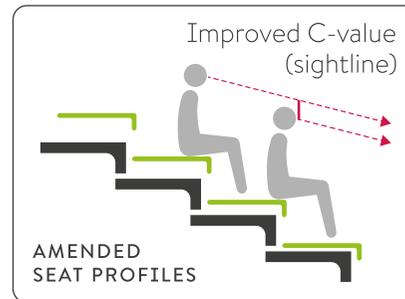
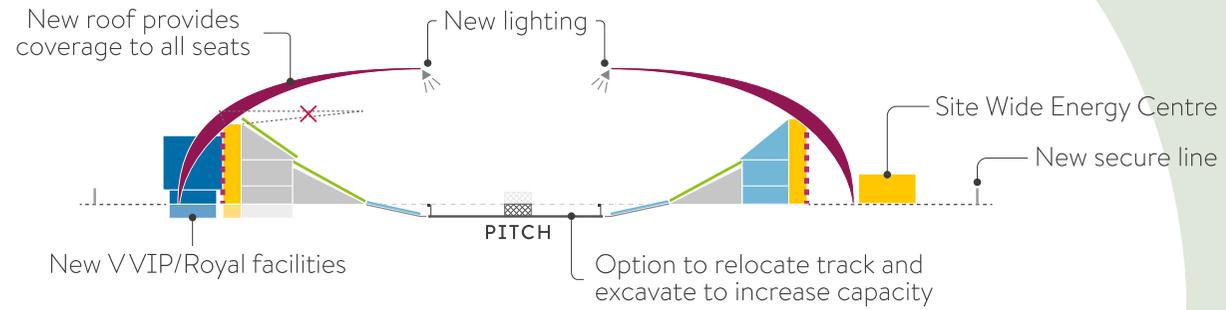
Zoning of Stadium Services

Plan view: after



Zoning of Stadium Services

Section view: after



KEY TO COLOURS	
1	New tiers
2	Amended seat profiles
3	New roof & facade
4	Servicing & Operation



4. A FRAMEWORK FOR SUCCESS



A framework for success



Critical to success is a robust business model founded on two key principles: stadia are not standalone entities; and they must be made fit for the future, not just for today.

Viable, self-sustaining stadia should complement their local environment and be in near constant use. If they don't, they threaten to become costly monuments inhabiting dead space. But by taking a strategic and creative approach to the events their stadia host, and adopting funding models that rely on the provision of top-quality services, facilities and experiences that enhance capacity, the region's sports authorities can avoid such a fate.

In our experience, four core elements distinguish successful strategies:

1. COMPLIANCE

If you aspire to host world-class sporting events your stadia must be compliant with the requirements of the principal global sports governing bodies: the International Federation of

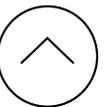
Association Football (FIFA), the Union of European Football Associations (UEFA), the International Association of Athletics Federations (IAAF), Asian Football Confederation (AFC) and the International Olympic Committee (IOC), to name just a few.

These requirements are remarkably comprehensive. They range from specifications regarding the size of the playing area and what it's made of, through the location of dressing rooms, press cabins, hospitality areas and security cameras, to the ratio of car-parking facilities to spectators and the sustainability of resources used both within the stadium and as a result of getting people in and out of it.

Right now, few existing stadia in the region meet such standards. Dubai-based football stadia, for example, are single grandstand venues and largely uncovered. Some regional stadia have already been

successfully upgraded, however, and within tight timeframes. Consider, for example, how the Sheikh Zayed National Stadium was extensively refurbished in time for Abu Dhabi to host the 2009 FIFA World Cup Championships (see *Sheikh Zayed National Stadium: An innovative refurbishment in record time*, page 14).

By better understanding what features of a stadium may benefit from refurbishment, the process of becoming compliant can be approached (and tackled) faster and more successfully (see *Zoning of Stadium Services*, pages 9-11).



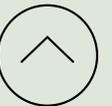
Sheikh Zayed National Stadium:

An innovative refurbishment in record time

In 2008, when Abu Dhabi was appointed host of the 2009 FIFA World Cup Championships, the Sheikh Zayed National stadium, first built more than 30 years ago, required a significant upgrade. Pitch lighting, for example, didn't conform to modern standards, or with modern broadcasting requirements. Glare was also an issue, due to the low roof and positioning of the TV cameras.

A world-class facility with seating for well over 40,000 spectators was completed within months of starting work on site and in time for the first game, which was played in December 2009. New pitch lighting, upgraded mechanical, electrical and plumbing systems, new media facilities, and new corporate and royal boxes were among the project's accomplishments.

The stadium's new VVIP box construction is particularly noteworthy. With a roof built to support a fully retractable glazed facade, using threaded tie rods modified to suit the tolerance of the glass, it allows spectators to experience the stadium from both an environmentally controlled and more natural perspective.





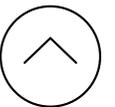
2. A MULTI-PURPOSE ROLE

Ideally, stadia should be designed from the outset for multi-functional and multi-modal roles. But they can also be refurbished to rise to the challenge. London’s former Olympic Stadium, now The Stadium, Queen Elizabeth Olympic Park, for example, was successfully upgraded and transformed to host both rectangular and oval field sports, as well as community sports and a wide range of entertainment events (see *Transformation of the former London 2012 Olympic Stadium: Serving sport and the community*, page 16).

Even venues built for a specific sport can be converted cost-effectively to host temporary events by providing more light, power and space to support their adaptability. Temporary overlays allowed The Stadium, Queen Elizabeth Olympic Park to host the 2015 Rugby World Cup, for instance. And if the stadium location is accessible and active, even when the stadium itself is not in use, it can act as a magnet for other forms of investment – in retail, housing, services, culture and entertainment – helping to create jobs and regenerate the local area.

It would be hard to exaggerate the benefits of integrating stadia into both the wider neighbourhood and existing infrastructure. By aligning stadia facilities with local health and wellbeing programs, they can become showcases for healthier lifestyles, for example. And by aligning stadia developments with local schools and businesses, local employment opportunities can be significantly enhanced.

By aligning stadia facilities with local health and wellbeing programs, they can become showcases for healthier lifestyles.



Transformation of the former London 2012 Olympic Stadium: Serving sport and the community

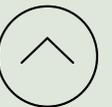
When the London Legacy Development Corporation recognized the former Olympic Stadium's multi-purpose potential in an under-developed area of East London, they commissioned a refurbishment that would not only transform the stadium into a venue for Premiership football and international track and field athletics, as well as both codes of rugby and oval field sports such as cricket and baseball, but also a facility for community sports and even major concerts.

According to London Legacy Development Corporation Stadium Executive Director Colin Naish, the stadium's success has helped "attract other world-class institutions to the Olympic park" – witness the planned Olympicopolis facility, which will house branches of the Victoria and Albert Museum and Sadler's Wells theatre, as well as campuses for the University of the Arts London and University College London. The London Legacy Development Corporation is also in advanced discussions with Washington DC's Smithsonian Institution about

locating a branch there. And since the goal is for 75 percent of the projected 3,000 jobs to be created to go to local residents, the impact on the area's regeneration is expected to be substantial.

Key features of the upgrade included substantial new accommodation both inside and outside the stadium, moveable seating, an enhanced seating bowl, and a completely new roof to cover all of the seats in all stand configurations.

The roof was particularly challenging because of the desire to retain the original perimeter roof steelwork as a symbolic legacy of the 2012 Olympics. But an innovative, suspended cable net concept was developed, utilising the full capacity of the original steelwork. It now supports the biggest spanning open stadium roof in the world.







3. COMMERCIAL LONGEVITY

In our experience, a stadium that’s in use for 200+ days a year is the basis for significant commercial returns. Which underscores, of course, the importance of extending usability, and of maintaining it during refurbishment.

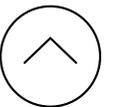
A stadium’s long-term financial viability hinges, indeed, on its role as part of a wider offering. Case in point: the TD Place Stadium in Ottawa, Canada, which is one component of an extensive, 47-acre redevelopment effort encompassing retail space and an urban park for the people of Ottawa (see *TD Place Stadium: A wider offering*, page 19).

Most existing venues in the Middle East are still government-funded, with a single tenant and a single purpose, which complicates the case for creative, long-term funding models. However, as Hadi Michel El Jallad, Head of Technical Department, Engineering Manager, at Bouygues Batiment International points out, “the right business case could change that”.

Strategic investments can help expand a stadium’s commercial footprint, for example, by maximizing regularity of use. Conferencing and corporate hospitality options need to be explored. And owners of the land on which a stadium sits can also generate real-estate revenues by considering investments in adjacent hotels and retail outlets – perhaps in partnership with private operators.

Stadia require plenty of support services, from catering to cleaning, so there are ample opportunities to develop local supply chains. Furthermore, the long-term economic impact of a stadium – and thus its commercial viability – can be enhanced by local skills development, as well as by investing strategically in a flexible and scalable local transport infrastructure.

200+ days
usage a year
for significant
commercial
returns



TD Place Stadium: A wider offering

The TD Place Stadium (originally Lansdowne Park and formerly Frank Clair Stadium) has existed in rudimentary form since the 1870s and as a complete stadium since 1908, but a renovation completed in 2014 significantly re-energized the venue – largely by enhancing its integration with its surroundings, a development that has also boosted the stadium’s commercial viability.

The historic north stands were preserved and refurbished to contemporary standards, while the north-side exterior was expanded to include 30,000 square metres of retail components. In addition, mindful of potential disruption, the contractor took an estimated 15,000 truckloads of concrete off surrounding streets by building a concrete plant on-site.

Home to the Canadian Football League’s Ottawa Redblacks, the North American Soccer League’s Ottawa Fury, and the Ontario Hockey League’s Ottawa 67s, the stadium also accommodates university and community sports, as well as concerts. Its most striking feature is a “veil” of glu-laminated Alaskan yellow cedar timber that curls over the top of the new south stands and concourse, creating an harmonious complement to the surrounding structures and landscape.

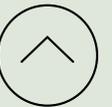




Image: Janna K



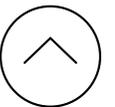
4. ATMOSPHERE AND EXPERIENCE

Because sports stadia host some of the most exciting and inspiring human spectacles, atmosphere and experience determine their success. Give spectators the right atmosphere and experience, and they will come back for more. Deliver the wrong one, however, and the reputation – and hence future viability – of a venue could be permanently damaged. Stadia should be designed so everyone has a clear line of sight, for example. And the provision of a safe and inclusive environment, not only within the stadium but also in the surrounding precinct, is critical to ensuring that everyone has a good time.

The interaction between performers and spectators – and even between different spectator groups – generates atmosphere, and this can be enhanced by the operation and design of the venue itself. Fantastic sightlines, brilliant acoustics, memorable hospitality, and inspirational architecture can all create an environment conducive to both world-class

sporting performance and memorable spectator experience. The Sochi Winter Olympic Stadium in Russia, for instance, was designed from the outset with drama in mind.

Such effects are multiplied when (as it should) a stadium plays a prominent multi-purpose role in its local community. By considering the potential for a wider variety of spectator experiences, the stadium’s commercial viability will be extended. Furthermore, focusing on the reinvigoration of the surrounding environment – and the stadium’s integration with the wider infrastructure and community – will attract an even broader range of spectators and visitors, and further enhance the experience of users.



Sochi Winter Olympic Stadium: Designed for drama

Atmosphere and experience were critical to the design of the Fisht Olympic Stadium – the central venue for the Sochi 2014 Winter Olympics and Paralympics: hence the decision to make the most of the stadium’s spectacular natural surroundings.

The asymmetric twin arches that support the stadium’s roof are major statements of Russian construction expertise. But their iconic vernacular aesthetic is further enhanced by the design of the roof itself, which has the appearance of snowy peaks, as well as by the views that it frames at either end – toward the Krasnaya Polyana Mountains to the north, and over the Black Sea to the south.

The stadium was built not only to host the opening and closing ceremonies of the 22nd Winter Olympic Games, but also as a venue for the 2018 FIFA World Cup; and it has become the winter home of Russia’s national football team when the natural turf in Moscow is frozen.

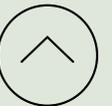




Image: Korea.net – Official page of the Republic of Korea

5. KICKING OFF



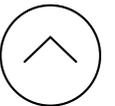
Kicking off

We believe this paper presents a compelling case for stadia refurbishment as a means of delivering both world-class sporting status and multiple local benefits – cultural, social and economic. Such projects can strengthen communal identity, encourage social cohesion, improve public health, boost business and create jobs: all, moreover, for the long term.

The keys to success are a vision of the stadium as an organic entity that complements and integrates with its environment, and a commitment to ensuring that it remains in near constant use. Atmosphere and experience are critical. But so too is compliance. And a multi-purpose role will help support the commercial longevity that sustains success.

Repurposing existing stadia also presents challenges, of course. But none is insurmountable. And just as in sport itself, playing to win promises its own rewards. In a region ripe for the multiple benefits that refurbished stadia can deliver, the time to start raising the game is now.

Such projects can strengthen communal identity, encourage social cohesion, improve public health, boost business and create jobs: all, moreover, for the long term.



6. AUTHORS AND ACKNOWLEDGEMENTS





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Director

Matthew is BuroHappold Engineering's Global Sports Sector Director and leads an integrated multi-disciplinary sports building design team based in Bath. He joined BuroHappold in 2006 and became a Partner in 2013, after 12 years' prior experience working in a wide range of sectors and countries. Matthew has degrees in both Engineering and Architecture, and believes passionately in the value of integrated design and total engineering – where Engineering, Architecture and Construction are combined into a single holistic solution.

He has extensive experience of long-span and form-active structures, and has been instrumental in developing BuroHappold's global reputation for the design of lightweight, demountable and complex engineering enclosures. He has been

heavily involved in both the conceptual design and delivery of many iconic sport and leisure venues with Architects, Contractors and as Lead Consultant. He has also led the technical teams for both the Emirates Air Line cable car over the river Thames in London, and Up at the O2, the spectacular climb over the roof of the O2 Arena.

Matthew has more than a decade of substantial sports building experience. He led BuroHappold's work on the Sheikh Zayed National Stadium in Abu Dhabi, the King Saud University Sports Campus in Riyadh, and the Silverstone redevelopment in the UK. He was also BuroHappold's Principal for the ongoing works at The Stadium, Queen Elizabeth Olympic Park, Tottenham Hotspur FC redevelopment at White Hart Lane, and the Etihad Stadium in Manchester.



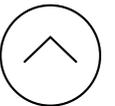
Phil Dalglish

BE CEng MCIBSE

Partner

Phil has nearly 30 years' experience in the leadership of building design teams and projects. In 1998, he joined BuroHappold to provide the strategic project liaison between UK based designers and key UAE clients. In 2000, Phil was appointed as BuroHappold's Middle East Regional Director, which culminated in him joining the BuroHappold Partnership in 2003.

With a building services specialism, and a thorough knowledge of integrated design and construction, Phil uses his current Partnership Principal position to work closely with his clients and collaborators to tackle the unique challenges of development work in the region.



We would like to thank those who contributed towards this report:

Hadi Michel El Jallad

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Colin Naish

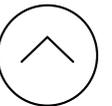
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