TEMPORARY STADIA AND MAJOR SPORTING EVENTS

In this Q&A, three industry experts provide their insights on the key design and operational considerations when it comes to Temporary Stadia & Major Sporting Events.

David Manica

Paul May

Daniel Cordey

The three industry experts providing their insights for this key industry feature are: David Manica (above left), Principal, **MANICA Architecture**; Paul May (above centre), Executive Director & Chairman, **Trivandi**; and Daniel Cordey (above right), Chairman, **AGES (Association of Global Event Suppliers)**.

How do you believe modular building technology could benefit the sport industry?

MANICA has spent a lot of time focused on the positive ways modular and prefabricated construction techniques could be applied to temporary or portable venues in the sport industry. We all know that the rotating cycle of world sport events encourages and fosters a never ending cycle of new build opportunities for host cities. But those venues are most often underutilised or even abandoned post event at great cost and expense. For me, it was exciting to see London's more creative approach to some of their smaller Olympic venues – utilising a number of temporary facilities in and around the city centre. The temporary venues promoted a wonderful atmosphere and a respectable legacy.

Modular and temporary building components will play an increasing role in the make-up of major events and stadia projects, and this is because they bring a range of significant advantages. In the case of London 2012, our whole venue master plan was driven by the need to avoid 'white elephants', to achieve a high level of efficiency and to showcase London as an impressive backdrop. Consequently, we relied very heavily on both modular construction techniques and on temporary event infrastructure. Entire venues were designed to be fully demounted after the Games and their components are now being re-used on other sporting projects and venues within the UK and across the globe. This approach enabled us to reduce cost and minimise build times, as well as delivering on some really challenging sustainability targets. This was achieved without compromising quality – we focused heavily on the visitor experience and allowed the iconic locations to speak for themselves.

The temporary infrastructure required to host sports events needs to be in the right place, at the right time. Furthermore, the quality needs to be high. Safety and reliability are key, there is no tolerance in this respect. Modular building technology fulfils all of these requirements. Modularity not only enables to build to the right size, faster and more cost-effectively, it is often a well proven technology with high reliability. Also, modular building technology is able to adapt from one event to another, and provides flexibility to venue organisers. Modular building technology can often be 'hired' for a specific period of time and therefore reduces the infrastructure cost to what is indispensable. Furthermore,

London 2012 was an exemplar for sucessful temporary stadia usage. Credit: Trivandi

modular technology is easy for the organisers to operate. With the support and supervision of experts, organisers can operate and use most of the infrastructure with their own staff.

What do you believe will be the greatest challenges for this kind of approach?

I think one of the greatest challenges for the industry as it relates to modular/ temporary facilities actually relates to people's preconceptions of what "temporary" means. It's been my experience that the terms "temporary" or "portable" are too often associated with products that are of lower quality. Instead of working toward sustainable and reusable building components, the temporary solutions more often than not have been considered as "disposable". I personally believe the answer to a truly sustainable temporary solution provides robust and high quality materials and finishes that are modular in nature, pre-engineered and prefabricated, and easily connected and unconnected for reuse later.

There is often a delicate mix between permanent infrastructure, demountable components and temporary commodities, and the trick is to get the balance right and to make them fully integrated. Success happens as a result of careful and well-informed planning. On London 2012, there was a really clear legacy plan and a solid understanding of the opportunities presented by demountable and temporary solutions. Temporary infrastructure can also have its limitations and so we made sure that we had a clear picture of these, which we then factored into our approach.

Crystal Hall, Baku 2012: a multi-functional arena based on the modular stadia© concept developed by NUSSLI. Initially conceived for temporary use, it is now used for many events, including concerts and the first European Games. Credit: NUSSLI

There are various challenges. Most at regulatory level, such as building codes, taxation of services or liability issues. As large events can take place anywhere on the planet, the regulatory framework changes from one event to another. In most countries there are no building codes for temporary works or at least no adequate ones, for instance, the seat shells used for London 2012 cannot be used for the Rio Olympic Games. Additionally, some tax authorities label temporary infrastructure as 'services', others as 'works'. And this is all before you bring temporary import procedures into the equation. Such factors make international business more difficult than it should be. That's one of the reasons why the recently formed Association of Global Event Suppliers (AGES), wishes to develop – together with governmental bodies such as the IOC – common standards and codes of practise for the future.

Another challenge is the early involvement of industry know-how in the design and planning process. Organisers could benefit significantly from involving them in developing 'smart solutions', but this needs to be at an early stage to enable the suppliers to develop an interesting business case for new products. Our members are however very pleased to see the change in mind-set with the IOC now promoting temporary infrastructure as part of its new Agenda 2020.

This kind of construction technique is used in other building industries, but why have stadia been slow to pick up on it?

There are some historic examples where temporary elements have been used successfully but we are now seeing an increasing interest in properly integrated temporary solutions. London 2012 is a great case study for stadium owners who are considering their options, as it showcased all aspects of permanent, demountable and temporary. The London Aquatics Centre is an example that successfully combined all three elements, whilst the Riverbank Arena (the Hockey Stadium) is a case study for a large and very successful temporary venue. The range and quality of temporary solutions is improving all the time as suppliers »

update their stock and clients and regulators place greater expectations on the marketplace.

There is a difference between the temporary event infrastructure needed to upgrade or extend an existing venue, as oppose to creating a complete temporary venue, such as the beach volleyball venue for the London Olympics. And the difference is even larger if such a venue is to become a fully operational, large-scale modular stadium for semi-permanent use, or even a fully covered modular arena, such as the Crystal Hall in Baku (pictured), which is now for permanent use.

There are many examples of modular stadia solutions. Some were used for a few months and then dismantled, and others remain in place, like Brita Arena (also pictured) in Wiesbaden. The construction techniques and building procedures are usually different depending of the expected time of use. Stadia for short-term use are mostly functional, scaffolding-based with modular space units and a minimal architectural design. Whereas for permanent use, structural steel construction with prefabricated elements and modular technology units comes into play. There is a wide range of design elements and other technical features that can be added as per the owner's requirements.

It is correct that semi-permanent or permanent modular solutions take more time to develop. Two factors play an important role: to build a modular, modern stadia fast and cost-efficiently, the builder needs to have a comprehensive knowledge about the design, planning, construction and operation of a stadia, and furthermore needs to have the capabilities to apply fully integrated procedures to guarantee timelines, quality, safety and costs of the project. In addition, the builder needs to build up an adequate supply chain, specific engineering capabilities and quality and interface management. Often the builder also needs to invest in certain building components and hardware. All this is a challenge and takes time. And, on the other side, designing and building a stadia is usually a complex task involving many different parties. Still, most of the projects are developed the traditional way, which is adapted to the classic construction environment. The design and construction of a modular stadia is an all-in-one solution, where the owner or investor works closely with the contractor in a partnership, defining the share of risks and responsibilities. This model cannot be applied everywhere.

Empire Field Stadium, Vancouver 2010: a modular stadia© solution for temporary use, it was constructed in 2010 and dismantled a year later.
Credit: NUSSLI

Can temporary structures be used to reduce the costs of permanent venue builds?

Re-use is not the only benefit of this approach. We have found substantial savings related to the delivery schedule and overall quality of fit out as well. Modular pre-engineered buildings allow interior building components to be fabricated in the controlled conditions of a factory while the construction of other non-modular aspects of the building are in process on site. So as an example, while a conventional approach to construction requires that the building structure be completed before interior fit out can begin, a prefabricated approach allows for interior spaces and building components (like suites, toilets, etc.) to be built off site, while the supporting super structure is being completed on site. This compression and overlap of the overall construction schedule can decrease the delivery time of the project by an estimated 20%. And, since "the sun always shines in the factory", the quality and delivery schedule of the modular components can be more rigorously controlled.

Absolutely, temporary solutions are relatively inexpensive and, if well planned, they can provide a really good quality outcome.

Temporary structures can be used either for a short time period or for permanent use. They have to be safe either way, but they will be different in many operational aspects, as well as in durability. Temporary structures will reduce the overall cost of permanent venues if they are designed well, i.e. to fit the purpose and the desired period of time. If the venue designer provides a detailed functional description of the required temporary infrastructure, then the international industry of infrastructure suppliers will offer the best suitable products on a hire basis, inclusive of the service to install, operate and dismantle the products. It would not make sense to design and build a venue just to match a one-time requirement of an event.

How big can you go with temporary structures?

As big as you like! Inevitably, very large temporary venues will often include modular construction components which can be demounted (such as steel framework and precast concrete elements) in combination with pure temporary event infrastructure such as seating, tents and cabins. The London 2012 Olympic Stadium is a good example where this was the case.

Technically, there are no limits. One can build temporary seating higher than any permanent grandstands, or one can build temporary dome shell structures to cover a 20,000-seat arena. But generally speaking, the cost difference between a temporary and a permanent structure will be smaller the bigger the structures are and the more sophisticated the venue fit-out is.

Do temporary stands offer the same level of comfort and safety as permanent stands?

Some temporary seating suppliers used London 2012 as an opportunity to invest in new, higher specification stock which provide a really good level of comfort and experience for the spectator and other users. From a safety perspective, the new seating products had to comply with The Green Guide as well as strict structural requirements and received a high level of safety oversight.

There is no difference in terms of safety, as both need to fulfil the same safety codes, especially for indoor solutions. The market offers many different categories and qualities of temporary stands, so there is no answer to this question. Actually, temporary seating may even offer greater comfort as permanent solutions.

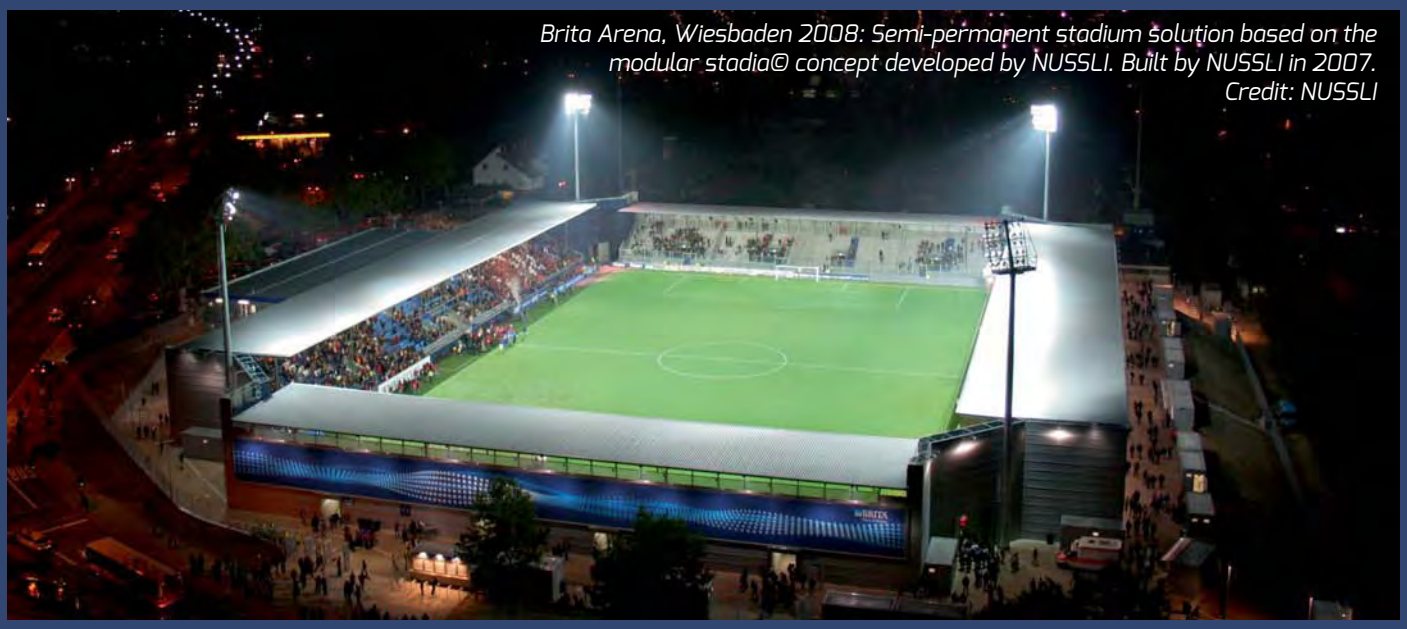
What is the future for temporary stadia?

One of our recent concepts incorporates both modular prefabricated components and purpose-built traditional construction techniques. But instead of building a stadium as a single building, our unique S.E.E.D. concept (as pictured below and featured in the *PS&AM Showcase Special 2014*, p48-50) unites a collection of smaller buildings together for the one-time sport event to create a world-class stadium.

Modular pre-engineered buildings allow interior building components to be fabricated in the controlled conditions of a factory while the construction of other non-modular aspects of the building are in process on site.

Credit: MANICA Architecture.

MANICA Architecture's SEED Stadium Concept takes sustainability to the next level by utilising a combination of temporary, re-locatable and re-purposable building types to create a world-class mega sporting event environment like any other.



Brita Arena, Wiesbaden 2008: Semi-permanent stadium solution based on the modular stadia© concept developed by NUSSLI. Built by NUSSLI in 2007. Credit: NUSSLI

Then, after the world event is completed, the prefabricated stadium components are dismantled and the various building structures can be easily readapted to become civic buildings that improve the standard of living for the local citizens, including schools, hospitals, low-income housing, etc. In this way, the prefabricated components for the large spectator crowd (such as the seating tiers and modular toilet and concession pods) can be reused by other cities, but the core infrastructure and investment in the various building structures can be repurposed as a truly sustainable legacy for the community.

We are already seeing an increased level of interest in temporary solutions as clients continue to confront their budget and sustainability challenges. This will lead to the need for greater integration between the permanent and temporary elements and suppliers will need to respond through the continued investment in new and more attractive products.

The industry of temporary infrastructure works strongly believes that the demand of such infrastructure will increase. The requirements for an event will increase and become more and more specific and, on the other side, the timeline will become shorter and the funds will be limited. The temporary industry can offer customised solutions driven by cost and/or time constraints. However, the market for large scale modular stadia solutions – for semi-permanent or permanent use – will be more difficult to develop. The product itself has a large potential but the business case needs to fit.

Mosaic Stadium.