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With their revenue streams temporarily halted by COVID-19, stadiums and arenas are seeking new ways to keep renovation and reprofiling projects on track amid scarce resources. In an industry where weight reduction equates to weighty benefits from a cost, time and environmental perspective – replacing reinforced concrete with a structural composite system offers a breakthrough.

Images: SPS Technology

From sports tournaments, to the plight of elite athletes, and world-music tours to isolated recording artists, the impact of COVID-19 on events hosted in stadiums and arenas has been devastating. As importantly, the stadiums and arenas that hold these events have experienced a historic standstill in revenue generation from blanket cancellations in most areas of the globe.

Faced with no clear calendar to mark the end of current economic turmoil, the industry must retain as much cash as possible, taking expenditure planned for renovation/reprofiling and new construction projects, and redirecting it to support core business activities and business continuity in worst-case scenarios. For those responsible for upgrading facilities, postponing work is undoubtedly an option, although for an industry that now expects to operate with squeezed margins for years to come, this is only postponing the inevitable need for work to be carried out. For those

that either have to or wish to complete work as soon as possible, there is a new, failsafe approach that also saves time and is cost efficient; utilising a breakthrough structural (steel-elastomer-steel) composite plate instead of traditional reinforced concrete.

This fresh approach is not a short-term 'COVID-19 only' solution; it delivers a range of long-term benefits, fulfilling communities' growing need for improved sustainability and demands to future-proof stadiums and arenas against both the effects of, and the need to mitigate, climate change.

For many years, reinforced concrete has been synonymous with the construction of stadiums and arenas, acting as the structural building material of choice to create spectator stands, walls, stairs, platforms etc. While the material has a long track record, it is not without limitations. Its vast weight and resulting considerable labour, time and transportation requirements now faces increased scrutiny from budget holders confronted with depleted

project budgets and operators confronted with increased maintenance costs.

Given that concrete quite literally underpins stadiums and arenas across the world, the question of sourcing an alternative is one that requires considerable thought by prudent decision makers.

Industries concerned with the construction environment tend to be conservative, which makes breaking with traditional approaches to venue renovation and reprofiling a challenging task – even in an era where COVID-19 is transforming working practices in many industries at record speed.

For risk-averse project managers, there are aspects of the project design that can be changed without venue owners exposing themselves to the additional risk – perceived or otherwise – that inevitably comes with the use of new technologies. A breakthrough structural composite plate, known as SPS, very much sits under the umbrella of 'smart construction' initiatives, which make full



use of digital technologies and automated manufacturing techniques, improving productivity, minimising whole life cost, boosting sustainability and maximising user benefits.

This breakthrough composite, which comprises two steel plates bonded with an elastomer core, offers a very high strength-to-weight ratio – making it a highly suitable alternative to reinforced concrete in an industry where weight reductions equate to weighty benefits – both from a cost, time and environmental perspective. Terraces made from SPS have already been used in stadium and arena bowls across the world, including: Avaya Stadium, home to the San Jose Earthquakes, USTA Grandstand and Court 17, U.S., Anfield Stadium, home of Liverpool Football Club, in the U.K and Philippine Arena, Philippines.

The production of concrete terraces involves offsite manufacture and transportation to the venue for installation. While an effective

process, concrete terraces are very heavy, requiring a large number of trucks for transportation at a high cost, time, and CO₂ footprint. Upon arrival, heavy-duty cranes are also required to manoeuvre units into position, adding further costs due to the high daily rates charged for equipment and operation. By contrast, the structural composite plate is very lightweight and easily stackable for transportation. This means it requires fewer vehicles for delivery, and, upon arrival, smaller cranes can be positioned at either end of the terrace under construction or pitch side during installation. All this means lower vehicle and installation costs, enhanced safety, reduced risk, plus reductions in overall project completion times averaging 15%. This is highly beneficial in an era when off seasons are likely to be reduced or eliminated entirely in order for venues to reschedule events postponed during the COVID-19 pandemic. For urban stadiums in particular, site access is easier and more cost effective for smaller

mobile cranes, in comparison to larger crawler cranes that would be required to manoeuvre reinforced concrete terraces. In fact, in some cases, bringing large cranes to site may be impossible, preventing improved stadium modification with concrete risers.

Lowering the weight of construction building materials by replacing reinforced concrete with structural composite plate can also have profound benefits for the overall steel frame of a venue, cutting its weight by 30% – with all the associated cost, time and environmental benefits that come with a lighter supporting structure. This has significant benefits at new build and venue renovation stages, with the lightweight structure enabling major projects to be completed without demolishing the entire existing structure.

The structural composite can also be bolted on top of existing structures, allowing architects to re-profile stands, with huge cost and time savings. On a smaller scale, new features such as disability platforms, balconies and



VIP areas can also be added with ease – while seats fitted on rails bolted direct to the structural composite can be easily adjusted, to create space between seats to maintain social distancing. At the end of an event, the same seats can be easily washed down with disinfectant, with the non-porous surface of the structural composite reducing the risk of COVID-19 and other viruses and bacteria lingering on surfaces. In addition to recouping immediate overall project cost savings of between 15–20%, the utilisation of the structural composite creates further opportunities for added revenue generation when stadiums and arenas re-open to fans – with enhanced uninterrupted sight lines, which are delivered by long-span terraces of 7.5-metres (24ft) average, with significantly longer lengths available. Dry space below the terraces is used for concessions. Fewer supporting structures means more

space is available below seats that can be made available to franchises, with all revenue going to back to the venue owners. Looking further into the future, with many venues focusing strategically on making their facilities multi-purpose and multi-functional, the ability to modify existing structures with additional terrace units allows venues to accommodate more varied sports, and support a transition from sports tournaments to a music venue. When looking at future-proofing stadiums and arenas, the structural composite can incorporate efficient, under-seat heating, ventilation, and air conditioning (HVAC) systems with ducts for cooling and heating the immediate spectator space (directly below each seat) in a stadium or arena. This ensures a safe and comfortable guest experience with affordable running costs in years to come. At the time of writing, it is difficult for stadium and arena owners to plot a conclusive plan

away from the isolation triggered by COVID-19, as it is for so many industries right now. What is clear is that business as usual will not be able to continue at hubs for interaction, where it is hard to use mitigating interventions such as good hygiene practices, for some time to come. However, despite the unprecedented challenges, it is feasible to cut near-term expenditure, while propelling venues from antiquity into a new modern era. By exchanging reinforced concrete for breakthrough structural composite plate, tight project timelines and budgets can be met, while returning visitors will benefit from a venue that is increasingly multi-purpose, multi-function, with all changes underpinned by environmental benefits. In the face of the biggest challenge in modern history, successfully rethinking the way venues are built, renovated and reprofiled may hold the key to an intelligent recovery from COVID-19 and long-term success.