slipped discs

Archi-Tectonics unveils an intersecting elliptical design for Hybrid Stadium to open the 2023 Asian Games in Hangzhou.

Text by Rebecca Lo
Photography by SFAP Shanghai

(Above) *Hybrid Stadium fronts a lake within a new ecopark sited in the developing neighbourhood of Gongshu in Hangzhou.*
(Facing page) *Juxtaposing materials of brass shingles meet a double curved glass diagrid framed in steel along the elliptical façade of the stadium.*

Cities have a love-hate relationship with international sporting events. On the plus side are the prestige the spectacle brings and the tourism dollars that its iconic stadiums draw. On the minus side is the infrastructure investment necessary for an extremely brief experience. Many municipal governments simply do not want to be saddled with white architectural elephants; they are not worth the newsfeed headliners.

Nevertheless, Chinese cities feel that world class sporting events can only be good: for its development, people and international cache. Over the past few decades, both the Olympics and Asian Games have been hosted by Chinese cities. Naturally, when Hangzhou welcomed international athletes in the fall of 2023, it needed its own version of the Birds' Nest. To that end, New York-based Archi-Tectonics won a 2018 competition to design the landmark stadium for the 2023 Asian Games.

green sponge

Ready to kick off the Games in September, the 35,000 sqm building is sited at the south end of a 47-hectare newly created eco park in the Gongshu district of Hangzhou. The capital of Zhejiang province has long been regarded as one of China's most beautiful cities, with an abundance of classic Chinese structures set against picturesque lakes.

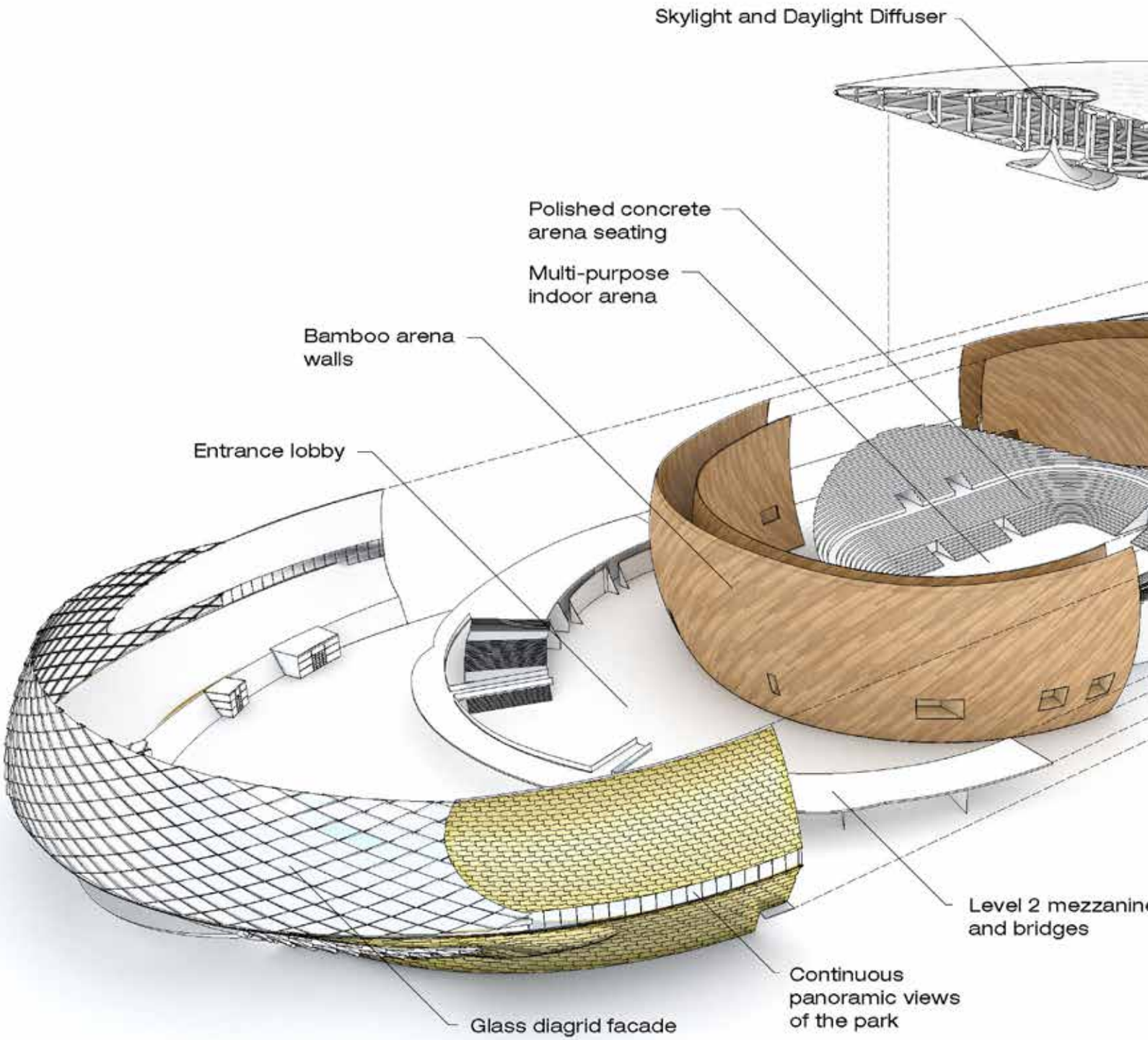
Contemporary Hangzhou is known for its

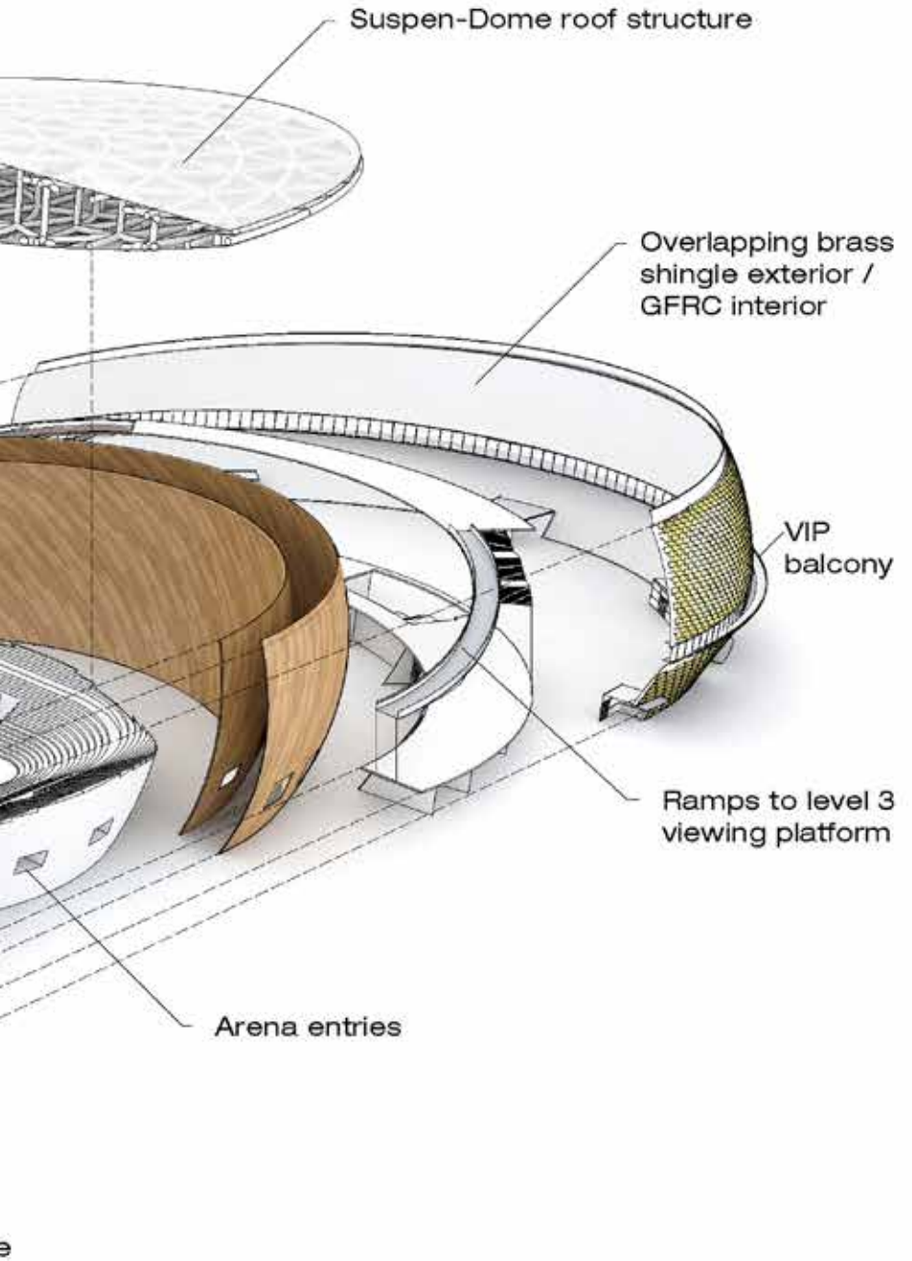
(Above) *A night view of Hybrid Stadium flanked by footbridges linking it to two nearby metro stations.*

economic and e-commerce prowess, with many company headquarters including Alibaba interspersed within a population of 13 million. To accommodate its rapid development, much of the wetlands of the city's outskirts have been replaced by skyscrapers. "The government took the opportunity of the Asian Games to create a new eco park as a green lung and exemplary implementation of the 'sponge city' concept (to retain, collect and filter rainwater for re-use in the stadium) for this fast developing neighbourhood," explains Winka Dubbeldam, founding partner of Archi-Tectonics.

A multifunctional structure was Archi-Tectonics' mandate from the outset, to give it longevity following the Games. Alongside a central viewing platform for athletic events, the flexible stadium can suit the asymmetrical layouts preferred for concerts and events that necessitate a stage. The stadium's usage dictated its form. "On one of my previous trips to China, I admired a mysterious artefact called the cong, a jade stone intersection of a square and a disc found in ancient royal graves," recalls Dubbeldam. "I liked the idea that it had both complexity and mystery – something we looked for in the hybrid." Though initially Archi-Tectonics explored the intersection of a square with a circle, the two forms eventually grew similar after much refinement. "These form iterations resulted in the intersection and offsets of two bulging discs: one that then solidified into a brass shingled volume and one that is expressed in the glass diagrid," she notes. "On the interior, the intersection creates a fluidity of movement – slippages in and out of the arena, and onto the exterior terraces overlooking the wetlands."

(Above) *An elevated corridor loops around the stadium in between the bamboo-clad inner bowl and the light-filled atrium. The wide northwest staircase connects the first and second floors with bamboo appearing as a double height handrail.*


Skylight and Daylight Diffuser
Polished concrete arena seating
Multi-purpose indoor arena
Bamboo arena walls
Entrance lobby
Level 2 mezzanine and bridges
Continuous panoramic views of the park
Glass diagrid facade



winka dubbeldam
Archi-Tectonics NYC

project name
Hybrid Stadium
location
Hangzhou, Zhejiang, China
site area
61,345 sqm
building area
12,000 sqm
gross floor area
35,000 sqm
year of completion
2022; open 2023 for Asian Games
architect/design firm
Archi-Tectonics NYC, LLC
lead architect/ designer
Winka Dubbeldam
developer
Gongshu District City Village Reconstruction Department
contractor/builder
China Power Construction Group East China Survey and Design Research Institute Co. Ltd.
M&E consultant
Thornton Tomasetti Engineers
local architect [LDI]
ZIAD

winks and shimmies

The hybrid elliptical form of the stadium features a skin designed to come alive with components that bring a textural quality where they overlap. The façade is composed mostly of brass shingles that meet a swath of glass and steel oriented towards a lake. “We used brass shingles because the material ages beautifully and has cultural relevance in China,” says Dubbeldam, elaborating that they are a composite of recycled metal with a thin top layer of brass. “The beauty of shingles is how they can be parametrically optimised to fit on a double curved surface while creating a very particular, deeply textured skin reminiscent of fish scales. When studying fish scales, it occurred to us that we should use planar glass for the diagrid. We created ‘eyelids’ in collaboration with our façade consultant Bill Logan – a system of small aluminium triangles that negotiates the planar glass back to the double curved diagrid. This not only enhanced the texture of the building skin to give a shimmering, fish scale-like appearance, it also significantly reduced construction cost and time. The glass sections bend and slice through the brass shingled surfaces, creating transparent areas where daylight can enter into the interiors.”

The interior of the inner bowl surrounding the arena is clad in bamboo, a material common to the region and chosen for its sustainable, renewable properties. The bamboo lends the spaces warmth and softness, contrasting with the glass and steel diagrid. To develop innovative structure for a 5,000-seat arena as well as column-free lobby areas, Archi-Tectonics worked with Thornton Tomasetti on a long span ‘suspendome’ roof.

The soaring 'suspendome' roof cantilevers above the lobby as it rests upon the inner bowl where all the action takes place.
***(Below)** Where the planar glass negotiates back into the double curved diagrid, small aluminium triangles resembling eyelids appear to shimmer when viewed from a distance.*

The dome rests upon the inner bowl and cantilevers over the lobby to support the outer shell of steel and glass, allowing daylight into the stadium. “A large oculus brings natural light into the bowl using a large sculptural deflector to soften sunlight and diffuse it evenly throughout the space,” notes Dubbeldam. “A continuous band of operable windows below the stadium roof facilitates natural ventilation of the entrance lobby and main circulation space surrounding the inner bowl. These windows also allow daylight to enter below the cantilevered ‘suspendome’, enhancing the sensation of a floating roof.”

soft treads

Throughout the entire process, Archi-Tectonics was mindful of the stadium’s environmental impact. It chose recycled metal for the skin and locally sourced bamboo as the primary material for interior cladding and doors. It used BIM to optimise the 6,300 brass shingles into just 85 variations. BIM further save an estimated 1,130 tons of steel in the final build of the stadium. In the end, construction time was accelerated by 20% for a completed structure a year before the start of the Games.

In the months following the Games, Dubbeldam is happy to see the stadium and its grounds enjoyed by Hangzhou residents. “The neighbours have flocked to the park and the buildings since it opened and frequently use the playgrounds and skate parks – even camping and fishing,” she smiles. “Every evening, people stream in to dance, do tai chi or yoga. I spoke to some who really love the park – including a social media enthusiast who was commenting on the building in real time on his one wheeler with some 5,000 viewers!”

The inner bowl, here configured with raked seating in the round for sporting events, can also accommodate single sided seating for concerts.