



CASE STUDY /

Ansys + K8T

“Scheduling time and conducting physical testing in a wind tunnel test environment requires long lead times. Our customer was marching toward a three-month deadline when it would have easily taken more time just to reserve a slot. Thanks to Ansys technologies, we can scale up to meet tight turnaround times overnight and meet their deadline in a few weeks.”

Paul Kingston

Managing Director / K8T

K8T Optimized Stadium Performance During the Pan American Games Thanks to Ansys Fluent and Ansys Elastic Licensing

With the Pan-American games currently underway in Peru, the highlight of the newly redeveloped Villa Deportiva Nacional (VIDENA) sport complex is its world-class athletics stadium. K8T developed an innovative wind screen for installation inside the stadium that provided aerodynamic control of the track's home straight. The screen design helped the stadium meet the necessary criteria and helped participating athletes improve their qualifying times for future international events.

/ Challenges

For the Pan American games to proceed, stadium wind dynamics are first subject to World Athletics compliance. Prevailing track dynamics dictated that runners would face strong headwinds during a race, skewing results and invalidating any world or track records. To change these conditions and achieve compliance required a simple, cost-effective wind screen system capable of reducing overall wind speed without creating adverse air flow conditions on the track.

/ Ansys Products Used

- Ansys Fluent
- Ansys Elastic Licensing

/ Engineering Solution

K8T used Ansys Fluent via Ansys Elastic Licensing to run a computational fluid dynamics (CFD) analysis of the proposed screen design through detailed modeling of local wind characteristics. The analysis provided critical insights into the wind flow characteristics needed to comply with World Athletics conditions for wind assistance during track and field events.

Both screen design strategy and performance were evaluated by running a model that was more than 450 million cells to establish associated air flows and magnitudes. On-site wind anemometers were installed and coupled with the CFD model to optimize the screen design. During screen construction, a 3D scan of the structure was carried out and the fins/sails were adjusted in the model to resolve any construction issues and optimize performance.

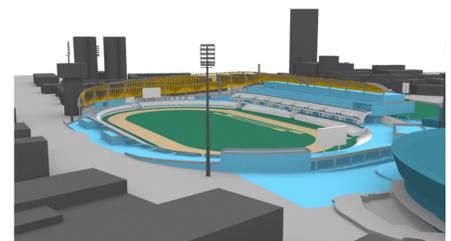
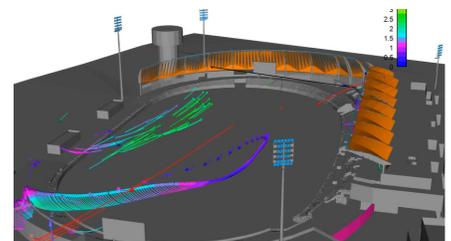
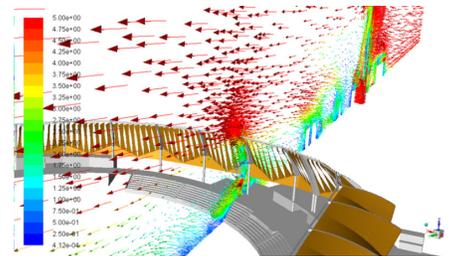
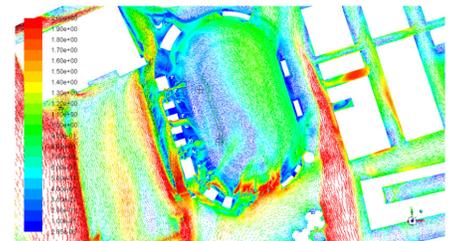
/ Benefits

- K8T leveraged Ansys Elastic Licensing, as well as its own cluster, to scale up and reach more than the required 200 cores needed to run the larger model.
- The ability to set up and run a larger model, requiring no simplification for CFD analysis of the unique screen design, helped engineers deliver the most accurate results.
- Computational results informed a design that incorporated adjustable louvres and wind sails, enabling wind flow on the track to be optimized adaptively depending on the strength of the wind.
- Performance metrics gathered during select events revealed that the adaptable screen design resulted in significant headwind reductions that positively impacted athletes' overall performance.
- Elastic Licensing enables K8T to efficiently meet fluctuating HPC demands throughout the year while accommodating high cluster usage periods associated with critical time-sensitive projects like the VIDENA sport complex.

/ Company Description

K8T Ltd. was formed in 2004 to provide engineering analysis and high-performance computing (HPC) calculations primarily in fluid dynamics and heat transfer, with a focus on building physics, environmental wind modeling, and pharmaceutical processes, as well as fire and smoke analysis. The company also delivers specialist evaluations of data center mission-critical environments, as well as energy analyses of buildings in the concept and operational stages.

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