

AERODYNAMIC FORM OPTIMIZATION: HIGH-PERFORMANCE SPORTS



Shaping wind-friendly forms for championship performance

Elite athletes need more than superior skills and flawless execution. In a wide range of sports, from discus to kayaking to alpine skiing, aerodynamics is gold. Small tweaks to aerodynamic form—of either the athlete or the equipment—can provide the championship edge. And for equipment manufacturers, rigorous testing is key: Elite athletes expect demonstrable performance improvements.

Our service

For manufacturers of high-performance equipment and apparel, we can evaluate the aerodynamic performance of your product at any stage of the product life cycle and then suggest (and test) enhancements. This evaluation can range from an expert judgment, to computational modeling, to fully instrumented wind tunnel testing to document actual performance.

For athletes, we can evaluate how your body positioning and equipment affect aerodynamic drag. We can fine-tune equipment so that



it works for you. We can also help you understand how typical wind patterns in the competition venue could affect your performance.

We're world experts in the demanding field of bluff body aerodynamics. The physics of air flow around a so-called "bluff body" is the same whether that body is a building or a bicycle or a human being. In all these cases, similar techniques are used to model and measure air resistance and aerodynamic performance.

We most often apply this expertise to buildings. Our wind engineering studies have determined the final form of several iconic tall buildings, including the Shanghai Tower and the Burj Khalifa in Dubai. In the case of the Shanghai Tower, for example, we found the best values for the amount of vertical taper and the orientation of the spiraling edges. The resulting building was just as strong but cost US\$50 million less to build. We can apply similar analyses to any bluff body to find efficiencies of production, performance or movement.

We are also experts in predicting micro-climate and hyper-local weather effects, and in assessing the interaction of wind and wave motion. For example, we frequently study the wind and temperature environments of stadiums and have experience working with many of the major sports stadiums worldwide. The statistics are interpreted appropriately in relation to your site. We also help you understand what those statistics really mean and how they can benefit your design.

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RWDI is a valuable partner to clients seeking to...

Explore Innovations

- Manufacturers: Maximize product development resources with early advice on ambitious product concepts
- Athletes: Explore adjustments (minor or radical) to form or equipment without risking competition results
- Athletes: Bust the myths of techniques and equipment by seeking hard facts

Create Opportunities

- Manufacturers: Compete in demanding markets by demonstrating enhanced performance and novel products
- Athletes: Learn how to exploit or compensate for local wind patterns in competition venues through simulation of event conditions

Meet Challenges

- Manufacturers: Demonstrate continuous improvement to drive sales
- Athletes: Overcome performance plateaus by making precisely targeted changes that will give you wings

Fulfill Expectations

- Manufacturers: Deliver demonstrable improvement for premium equipment

