

# RUNKLE CONSULTING, INC.



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## Wind Loads and Tornado Season in the South

Until we moved to Georgia in 1998, my children falsely believed that tornados only happen in Kansas and that hurricanes only happen in Florida. They were delighted to move from Pennsylvania with its yearly blizzards, thinking that none of these weather situations - hurricanes, tornados, or snow, ever happen in Georgia. It only took a year for them to learn that hazardous storms, with their lethal wind loads, can happen anywhere. In fact, tornado season and hurricane season form a nearly 7-month long continuous stretch of the year (April - November) in Georgia where the impacts of wind loads can be at their most deadly.

"Wind load" is the impact that the force of the wind has on the stability of any structure. The impact of the wind load is best summarized by the story of the "Three Little Pigs" - a huff and a puff will only blow a house down if it is not made of the

proper materials to withstand the force of that wind. That's why tornados and hurricanes are both measured and categorized by the strength of their winds.

In the winter months, wind load also causes snow drifts. A snow drift is where the wind has blown snow against a structure that is blocking the movement of the snow - such as when there is an inch of snow on the ground in a field but 3 inches of snow against the side of a tree in the same field. Like tornados and hurricanes, these loads place extra pressure on structures. However, they last much longer and can cause more damage due to the longer time length that they are pressing against a structure.

One of the more interesting things about wind load is how the pressure increases. It increases with the square of the wind speed. For example, let's say we have a wind speed of 25 mph. Let's double it to 50 mph. The amount of pressure it generates isn't double, it's *four times* the wind load at 25 mph. So, as the windspeed increases, our wind load increases very quickly. So, if we have a hurricane, and the windspeed goes from 100 mph to 110 mph, the wind pressure doesn't increase 10%, it increases 20%. So, when you see the weather report and you have what appears to be a small increase in wind speed, it can mean much worse news in the pressure the wind places on the structure.

In the 25 years or so we've been doing forensic engineering, I've only seen the wind itself doing major damage to structures as a result of tornado damage in the Atlanta metropolitan area. All of the structural damage (this doesn't count pulling away roof shingles, or siding) that I've seen is done by trees and other pieces of debris hitting the building. This is a good argument for keeping the trees in your yard pruned of dead limbs, and removing dead and dying trees from near your house.

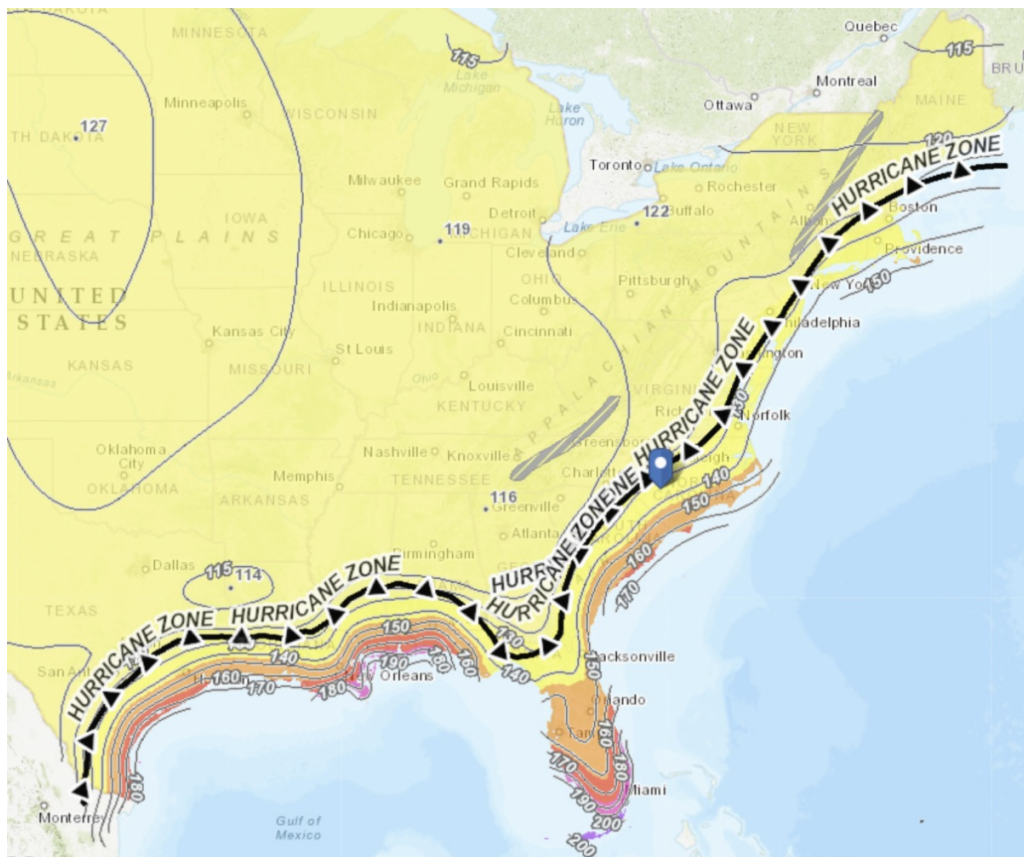
There isn't much you can do as far as tornado damage. The damage I've seen with tornadoes (the 2011 tornado in Trenton, GA in particular) happens mainly on the exterior of the houses and the upper floors. So, in a tornado, you want to take refuge in an interior room, in the lowest part of your house.

With hurricanes, the damage to the structure increases drastically if the building envelope is pierced. So, if a hurricane is forecast, you need to board up your windows so they don't break, and remove all stuff in your yard that can be picked up and thrown at your house by the storm. You also need to obey evacuation orders - it doesn't matter how tough you think you are, a hurricane is tougher.

As I'm writing this, we are forecasted to have major storms tonight in Atlanta. We'll be monitoring the weather, and we have planned out where to take refuge in the house if there are any tornado warnings issued. We also will be staying up during the storm so that we can take proper action if things get ugly. In the years I've been doing forensic engineering, I've learned that bad weather can't be taken lightly.



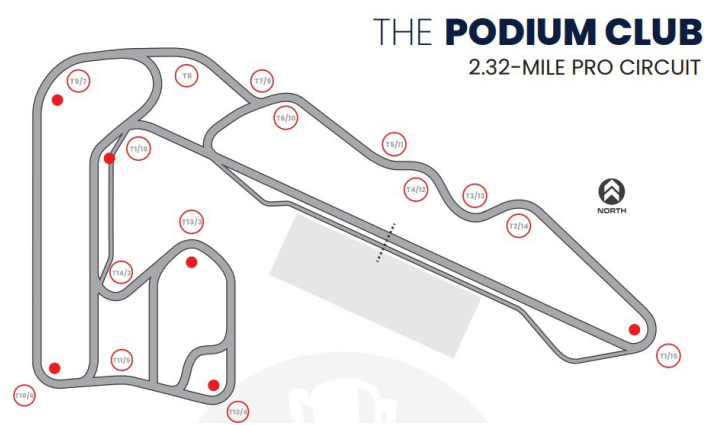
*Tornado damage near Trenton, GA from the April 2011 tornado (an EF-4 tornado)*



*Wind loads across the coastal areas of the southeastern United States are significantly higher than the rest of the continental United States. Wind loads on the West Coast are generally in line with what is depicted for the Midwest.*

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## **Project Spotlight - Podium Club**



Podium Club Racetrack in Casa Blanca, Arizona

Runkle Consulting has always been known for our work in Arizona - that's why even though we are on the east coast, our office hours are aligned to work hours in Arizona! Over the last year, we have been doing a variety of projects at The Podium Club, including garages and logistics facilities. So what is "THE PODIUM CLUB?" Their public relations explain the complex in this statement they provided:

The Podium Club is the cornerstone development for Attesa, a 2349-acre, master planned, international motorsports, advanced technology, and entertainment destination less than an hour from Phoenix, just 10 minutes south of Casa Grande, off Interstate 8.

Attesa is zoned as a multi-use community which will feature residential neighborhoods, retail and industrial districts, a hotel and convention center, RV park, and an FBO airpark with through-the-gate hangar homes

The Podium Club offers an ideal location for commercial and film production, ride-and-drives, team building events, internal and consumer promotions, new product introductions, and more. It offers a 15-turn, bi-directional racing circuit designed and built to meet Fédération Internationale de l'Automobile (FIA) and Fédération Internationale de Motocyclisme (FIM) safety standards at buildout.

Advantaged by a balmy climate, plenty of sunshine, and little risk of track closures due to inclement weather or natural disasters, the Podium Club offers a state-of-the-art testing and racing facility that is unmatched for convenience, safety, and affordability.

Location: 6870 S. Bianco Road, Casa Grande, AZ 85193  
602-707-7222 (office); 480-702-1074 (track)

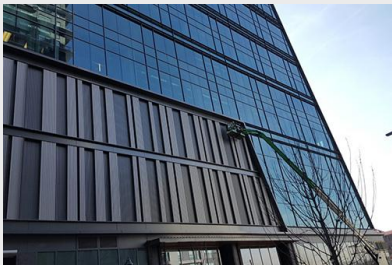


## Structural Engineers

Runkle Consulting was founded in 2000 by George W. Runkle III, PE, SE. We provide structural design for structures fabricated from shipping containers, the structural design for building cladding, and forensic engineering services.

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## What We Do



### Building Cladding

We have 15 years of experience in the structural engineering of exterior building panels, store fronts, and curtain walls for commercial and government



### Shipping Container Buildings

We provide design services for the design of buildings fabricated from repurposed shipping containers. Our services include the complete design package,



### Cold Formed Steel Design

We have extensive experience in cold formed steel design. We can provide structural design services and shop drawings for your project.

buildings.

architectural, structural, and MEP. Depending on the area, we may be able to help you find a fabricator to provide the containers.

[YouTube](#)

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