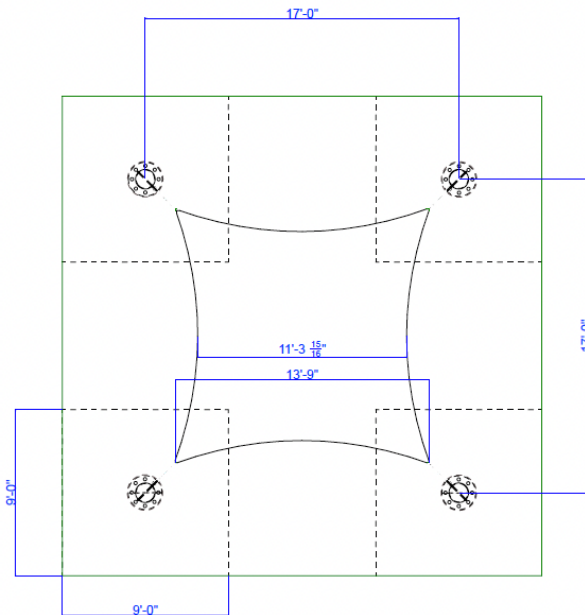
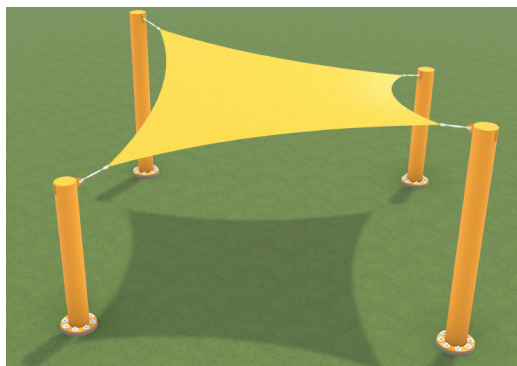


## Hawaii Shade Sail 101

Shade sails are a way to get shade overhead without a lot of steel or Aluminum framing. However in a commercial application these products require permits as the DPP mandates that anything overhead and over 300 square feet that covers more than 50% of the sky needs a permit. A permit will require that the property is allowed to have the additional covered space and that the product will meet or exceed a set wind speed. As of 5/12/22 that wind speed is 130 mph. In order to show this, engineering is required to determine the size of the cables in the fabric perimeter, the working loads of the turnbuckles in the corner, the size of the posts or frame that support the fabric, the quantity, diameter and embed depth of the hardware anchoring the structure and the size of the footings that the anchors are into.

These sizes are determined by designing the fabric in 3D software, and then running a plugin that simulates the fabric in a 130 mph wind scenario. The forces that are generated at the points of attachment are then given to a structural engineer who interprets these loads as sizing for the supporting structure.

To give you an example of what that means in regards to a sail with freestanding posts lets look at one we designed with posts 17' on center from each other:



Posts 17' from each other with the proper turnbuckles allow for a piece of fabric about 11' 4" wide at the center. When the engineering for this piece of fabric was completed we ended up with a system made from 12" sch 40 posts anchored by (8) 1-1/8" threaded rods embedded 2'6" in a footing that was 9' x 9' x 2'6". These incredible sizes for a such a small piece of fabric are due to the forces that this sail will create at 130 mph and the calculation that proves this will be what is required to obtain a permit for this product in a commercial application.

What that means for the end user is that the structures and attachments required by the DPP for a seemingly small shade sail can get rather costly. These structures with footings, engineering, fabrication, installation, permits ,etc. can easily exceed \$40,000. Costs can be reduced if there are elements in the area such as concrete buildings that can support the fabric. If posts are needed, footings are almost always required.

Amazon is full of shade sails that you can get for less than the price that Tropical J's can even get fabric to Hawaii for. The world is full of all types of these non engineered shade sails that work in most normal weather scenarios and a lot of people have had success with installing cheap systems that have only been exposed to low wind loads, and are cheaply replaced if they fail. However, if engineered, most of these systems would not be allowed by the Honolulu building code. The main risk here is that the attachments may fail and if the product and anchors are installed securely ,and the product is exposed to large wind loads, it is possible that whatever it is attached to could fail. If the product is not secure properly, it can experience large whipping forces which can have catastrophic consequences. In a public or even a private space, that is a liability for the property owner.

Tropical J's protects itself and its customer by selling products that will have an engineering packet showing proof of future performance.

I do not write this to deter people from shade sails as they are a fun and functional addition to many outdoor spaces and in areas where we have good existing attachment structures, they can be cheaper than a fabric supported by a large steel frame. But there are rules that we must adhere to when we execute these which can large cost impacts. This is why you see very few shade sails on our website and no residential products. At this level of performance, the return on investment can be insufficient for a lot of our customers.