Finding the Safest Shape

Olsen, Greta

Tornadoes and the straight-line winds that come with them can cause major building damage. I want to know if changing something as simple as the shape of a building could make it safer against straight-line winds. The less drag (wind resistance) a building shape creates, the safer it may be in straight-line winds. My hypothesis was if six shapes (a cube, a rectangular prism orientated horizontally and vertically, a full cylinder, and a half-cylinder orientated to the curved side and straight side) with the same surface area are tested against straight-line winds, then the full cylinder design will withstand the straight line winds the best because the cylinder has the most rounded edges similar to a sphere. Each test was conducted in a wind tunnel for sixty seconds. When the fans turned on to a constant speed, the force of the wind pushed the shape away from the Force Sensor it was attached to, which increased the amount of Newtons registered on the device. My results show the curved half cylinder created the least drag (0.1164 Newtons) and the tall rectangular prism created the most (0.1930 Newtons). This evidence did not support my hypothesis. Although I thought the full cylinder would create the least wind resistance, it still created the second least average amount of drag (0.1372 Newtons). This leads me to conclude that a building with some type of curved sides could potentially withstand more straight-line wind, therefore becoming a safer shape and possibly a safer tornado shelter.

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