

2023Q5

WIND TURBINE TOWER

Welcome back to another wind study! Last week we talked about the nitty gritty of the concrete foundation, this week we're taking it up a notch and talking about wind turbine towers.

Each tower is 80m (~262ft) tall and is made up of four sections. The first two sections are the same diameter, but the top two sections taper. This means that the wind turbine tower has a smaller diameter at the top than it does at the bottom.

During construction, the tower sections are lifted using a crane. Each tower section is stacked on top of each other and attached together using steel bolts.



Figure 1: Construction of turbine tower

Now that we know a little more about wind turbine towers, let's dive into our questions!



Wind Study is intended for grades 5-8 and 8-11

Questions posted on: Monday Answers posted on: Friday

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Level 1: If the first section of an 80-meter wind turbine tower has a diameter of 4.5 meters and the third tower section has a taper of 1° , what is the diameter at the top of the third tower section? Assume each tower section is equal in length.

Level 2: For the same 80-meter wind turbine tower in the Level 1 question, solve for the diameter at the top of the fourth tower section. Assume the angle of taper is different than the third tower section and the fourth tower section has a bottom to top diameter ratio of 0.78.