WIND STUDY

Wind Study is intended for grades 5-8 and 8-11
Questions posted on: Monday   Answers posted on: Friday
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2023Q1   FUNCTIONS, AREA

Happy 2023! It's the first Wind Study of the year and we're going to start at ground level with one of the less glamorous, but nevertheless important, pieces of the wind turbine construction puzzle... the crane pad!

In the construction process of a turbine, a crane is a necessary piece of machinery. It is needed to lift each section of the tower, the nacelle, the generator, rotor assembly, and a host of smaller pieces of equipment. The crane needs a large area of sturdy surface on which to operate. This area is called the crane pad.

When One Energy constructs a turbine, the crane pad is usually a rectangular area cordoned off for crane operation. To ensure the stability of the crane, wooden platforms are constructed for each of the crane treads to rest on, ultimately bearing the load of the crane more efficiently. These wooden platforms are made up of thick, rectangular cuts of lumber. Crane pads can vary in size based upon the size of crane being used and the load the crane is lifting.

Figure 1: Crane on crane pad, flying the rotor during construction

Without further ado, let's dive into the questions. The focus this week will be on using algebra to solve the size of the crane pad.

Level 1: We want to figure out how big the crane pad will be. We can assume that it will be rectangular in shape. The length of the crane pad needs to be 1.5 times longer than the width of the crane pad. The total perimeter of the crane pad will be 250 feet. Find the length, width, and area of the crane pad.

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Level 2: We have another rectangular crane pad of which we want to find the length and width. The crane pad will have the same area as the Level 1 solution, but this time, the length is 45 feet less than twice the width. Find the length and width of crane pad.