2021A16 (MINIMUM AREA, PRESSURE)

Level 1: Given Force = 212,422 lbs, and Pressure = 3,000 lbs/sq ft, rearrange equation to get area of mat.

$$Area = \frac{Force}{Pressure}$$

$$Area = \frac{212{,}422}{3{,}000} = 70.81 \text{ sq ft.}$$

Level 2: Total Force = weight of crane + weight of load = 211,644 + 100,000 = 311,644 lbs. Given Area = 82 sq ft. Plug into Pressure equation:

$$Pressure = \frac{Force}{Area} = \frac{311{,}644}{82} = 3{,}800.54 \text{ lbs/sq ft.}$$

This is larger than the 2,000 lbs/ sq ft ground bearing capacity, so the mat is too small.

A crane mat in use