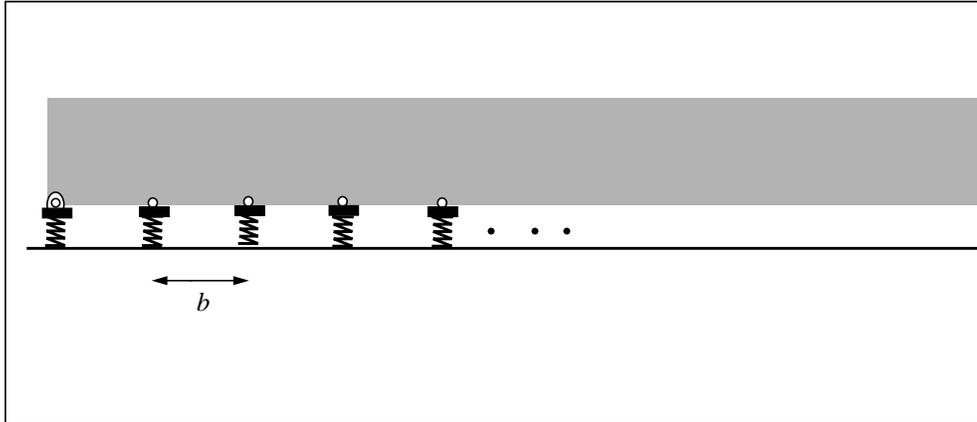


Design Exercise 3

1.050 Solid Mechanics

Fall 2004

A truss structure is needed to support a 1 kilometer stretch of roadway. The structure is supported, at equally spaced intervals of length b , atop 1 ft.-square pads which, in turn, rest directly on the sandy soil.



The equivalent spring stiffness of the soil is 50 to 150 lb/in per square-in of surface area.¹ Anticipated traffic includes fully loaded trucks as well as passenger vehicles.

Specifications include:

- Driver's should not experience disorienting rotation of their vehicle as they travel the roadway (e.g., as if they were going over hills and dale).
- The roadway is to accommodate but one lane of traffic.
- The structure should not yield.
- Truss members are to be made of steel. Take the allowable design stress to be 20,000psi.

While cost will ultimately be a factor in the design, you need only describe which features of the design will matter when costs are considered. Also, while existing codes will further circumscribe and even dictate the choice of some design parameters, these too are to be left aside for the moment. However, you do have available Trussworks to explore and fix on candidate structures worth further detailed design.

Due at the start of class on Wednesday, 27 October

1. Das, B.M. *Principles of Foundation Engineering*, 4th ed. Brooks/Cole, 1999, p. 318.