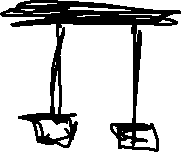
COMSOL Multiphysics 5.3a

Continuous span of bridge with pier and foundation

No abutments or approach spans included

First started with a 2D model to prove that dynamic soil structure interaction has an effect (parametric study)

* Footing column and slab model
* Fixed base and rotational spring conditions on foundation
* Create plot for sliding stiffness from cubic spline



* + Higher stiffness = higher damping
  + Higher freq sliding = lower stiffness (test on lower end, 0 to 2)
  + Rocking stiffness decreases

Three parametric study variables to investigate (Objective 1):

* Soil density
* Shear velocity
* Height-Width Ratio

Move onto 3D model of entire bridge structure

* Connections and meshing part of issues when constructing, took weeks to finalize
* Capture holistic behavior of the bridge
* Each component has settings that can be changed without compromising the scaling and connections within the model
  + Ex: change flange height, deck thickness, spacings
* Bearing Table shows that ends are expansion and pier cap is fixed, applied to model
  + Roller supports at ends (fixed vertical, allow rotations)
  + Pin supports at pier (fixed vertical and horizontal, allow rotations)
* Bearing table also states Alignment type bearings down center girder at every location
  + End and pier locations, Expansion Alignment & Fixed Alignment
* Use 11 braces instead of 16
  + Adding more braces significantly added 5x DOF’s to the mesh (very fine for steel members which are modeled as shells)
* Take structural dimensions and insert directly into parameters, model adjusts with ease
  + Footing dimensions, pier dimensions