Steel Design: Checklist and Procedure

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1. Vertical Frequency - Vertical Stiffness
   Most code impose a minimum value for the vertical frequency and from the required value we can obtain the minimum vertical stiffness.

2. Lateral Period- Lateral Stiffness
   From the required period, and considering the approximation of a rigid body motion for the structure, we can say that the period of the structure is the period of the isolation system, and from there define the minimum lateral stiffness

3. Axial Loads - Area
   From the properties of the rubber and the axial load demand (short and long term) it is possible to estimate the minimum area for each isolator

4. Lateral displacement - Rubber Height
   From the maximum deformation and the lateral stiffness we can easily obtain the required height(H_r of the isolator)

5. Shear deformation - Rubber Thickness
   From the properties of the material we can get the maximum shear deformation. The shear deformation due to the lateral force we have just computed, we just need to include the compression induced shear deformation[1], which depends on the shape factor, and therefore the thickness of the rubber

6. Number of layers
   Form the recently obtain height of rubber and thickness of rubber, define the number of layers

7. Steel Shims Thickness
   From the axial stress in the rubber estimate the axial stress in the steel shims and compute the minimum thickness of the steel.

8. Stability
   Define the thickness of the outer plates/shims and compute the isolator total height. Then check the following limit state

   (a) Buckling due to vertical load

   (b) Buckling due to vertical and lateral load

   (c) Rollover

9. Checks
   Once the isolation has been predesign it is necessary to perform a Non-linear time-history analysis to check all limits state and iterate until all conditions are satisfied[2]

[1] Consider short term load combination, and effective area
[2] Check traction in devices