Seismic Isolation: Pre-Design Procedure CIVIL 467-Advanced Structural Dynamics [R]

Vertical Frequency - Vertical Stiffness
Most code impose a minimum value for the vertical frequency and from the required value we can obtain the minimum
Lateral Period- Lateral Stiffness
From the required period, and considering the approximation of a rigid body motion for the structure, we can say that
Axial Loads - Area
From the properties of the rubber and the axial load demand (short and long term) it is possible to estimate the minim
Lateral displacement - Rubber Height
From the maximum deformation and the lateral stiffness we can easily obtain the required height(H_r of the isolator)
Shear deformation - Rubber Thickness
From the properties of the material we can get the maximum shear deformation. The shear deformation due to the late
Number of layers
Form the recently obtain height of rubber and thickness of rubber, define the number of layers
Steel Shims Thickness
From the axial stress in the rubber estimate the axial stress in the steel shims and compute the minimum thickness of t
Stability
Define the thickness of the outer plates/shims and compute the isolator total height. Then check the following limit sta
Buckling due to vertical load
Buckling due to vertical and lateral load
Rollover
Checks
Once the isolation has been predesign it is necessa
ry to perform a Non-linear time-history analysis t check all limits state and iterate until all conditions are satisfied[2]