NATURAL FREQUENCY AND BUILDING RESPONSE

structural engineers are keeping us safe
What is ground shaking?

- We know that seismic waves are produced during earthquakes and cause shaking.

- But how does this ground shaking really occur?

- Let’s take a look....
Frequency

- Frequency is how often a vibration occurs

- A hertz is the measure of frequency and is one cycle per second

- Frequency = # of cycles per second

Write this down!
Period of Vibration

- Period is the time it takes for one full cycle
- This means that period \( (T) = \frac{1}{\text{Frequency}} \)

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Write this down!
What affects frequency?

- Let’s define natural frequency:
  
  *Natural frequency is the frequency at which a system naturally vibrates once it has been set into motion.*

- It depends on the mass and stiffness of the system

- Let’s use the spring to help us...
What does all this mean…

…for earthquakes and windstorms?

- **Resonance** occurs when the forced vibration on an object matches the natural frequency of the object…
- Lets experiment and see what happens…