

Principles of Stability

1. Low Wide Base

- A structure is more stable when its center of gravity is lower to the ground
- A wide base allows a structure more opportunity to keep the thrust line within the base

2. Firm Foundation

- Last class we saw that solid dirt is better than loose dirt
- Dig down to solid ground
- Make a solid foundation (that is why they put gravel under roads when paving)
- We also saw that a larger surface area of the base will lead to more stability
- Spread the load (use a thicker foundation)
- Moisture in the ground can cause the soil to lose its firmness

3. Balanced Forces

- Recall that when forces in an object are not equal, it will move
- Two equal and opposite forces do not cause movement
- If something is balanced, it will be stable
- Example: tug-of-war, crane with counter weight, cables on boat masts (need high tensile strength)

4. Vertical Forces

- Arches transfer forces around the curve towards the ground vertically
- Trusses also use shape to align forces with ground

5. Rapid Rotation

- A bicycle is more stable when you ride fast than it is when you ride slow
- Figure skaters can stay upright on the tip of their blade when they spin rapidly