

Investigation and Research:

In this section show what you found while researching. Include locations where the information was found, pictures and diagrams. Explain in detail how this information will be of use in the project. This section will be several pages long as it will include the classroom lectures notes and activities on topics as well as individual groups research. For each topic that is researched it is helpful to create a new page. Include all images and important information from the research so it can be easily referenced.

Types of loads

Define (as related to structures) the terms listed below:

- Static Load: **loads that don't change with time; they remain constant.**
- Dynamic Load: **A moving or changing load like a motor vehicle in motion on a structure (as a bridge)**
- Equilibrium: **A state where all forces on an object cancel out and the net force is zero.**
- Natural Resonance: **Frequency at which an object wants to shake.**
- Efficiency Rating: **How efficient a task can be completed with reduced weight, difficulty, or time,**
- Safety Factor: **How much stronger a system is than it needs to be.**

Questions:

Static & Dynamic Loads

- When designing a step stool should you consider the static or dynamic loads it encounters when determining how strong it will be?

I would use a dynamic load because step stools are for stepping on and off and so it will not have a constant force.

Static Load:

- If this step stool will be used by 3 people in a household, and they weigh 125, 180, and 220 lbs then which persons weight must you design it for?

You must design it for the 220lb person but probably increase the safety factor in order to prevent the stool breaking if the 220 lb person has a heavy item in their hands or gains weight.

Safety Factor:

- If we want the stool to have a safety factor of 1.5, what would the ultimate breaking point of the stool be? **310 lbs**

Dynamic Load:

- Should the step stool be designed for the static load of the person or the force that the person will apply to the stool when stepping on the stool?

The load should be set for the force that the person will apply to the stool so stepping on the stool won't break it.

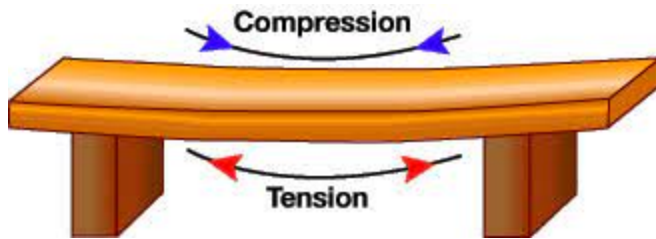
Is a person's Static or Dynamic load greater, and why?

A person's dynamic load is greater than the static load because the addition of the downwards force to a person's weight is more than just the person's weight.

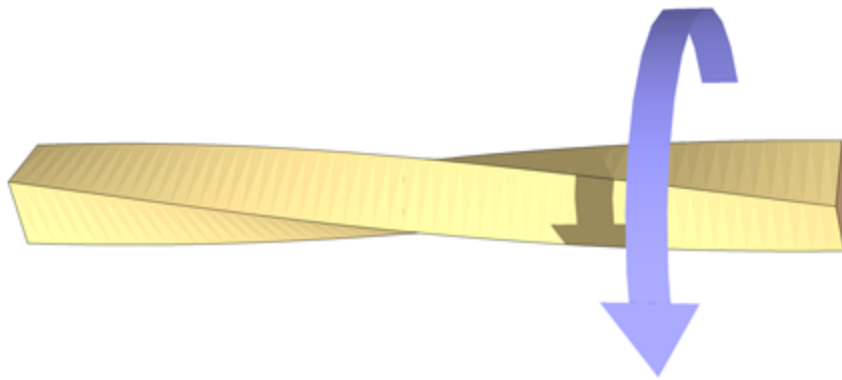
Basic Forces:

Define the following Terms as related to structures and provide a visual representation:

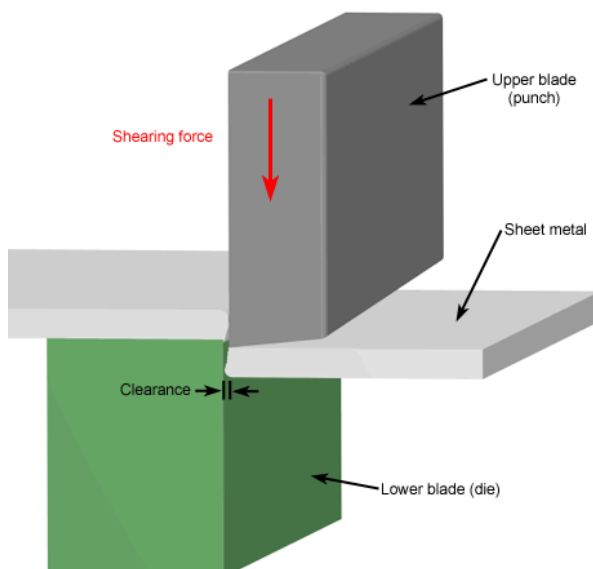
- Tension: **Tension is a state of stress in which a material is being pulled apart.**



- Compression: **Application of balanced inward ("pushing") forces to different points on a material or structure**
- Torsion: **the twisting or wrenching of a body by the exertion of forces tending to turn one end or part about a longitudinal axis while the other is held fast or turned in the opposite direction**

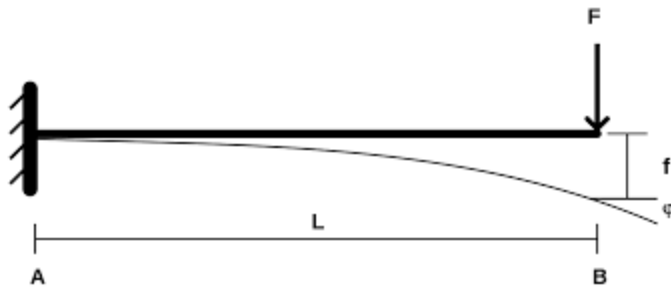


- Shearing: **Shearing is a metal fabrication process that's used to trim and remove unwanted material from sheet metal.**



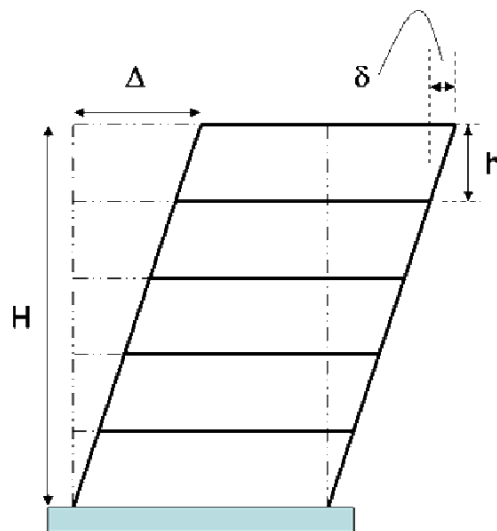
Explain in your own words what deflection is in terms of structures, and provide a visual representation.

Turning aside or a bending, or a deviation from the normal position of something.



Explain in your own words what wind drift is in terms of structures, and provide a visual representation.

Term for wind deflection, defined as the lateral deviation of a towers top from the original



line of origin **Figure 2.1: Drift Measurements**

Wood joints (specifically for balsa)

- Butt joint **technique in which two pieces of material are joined by simply placing their ends together without any special shaping**
- Miter joint **A miter joint is a joint made by cutting each of two parts to be joined, across the main surface, usually at a 45° angle, to form a corner, usually to form a 90° angle**
- lap joint **A lap joint or overlap joint is a joint in which the members overlap.**

Search for images of balsa earthquake towers.

