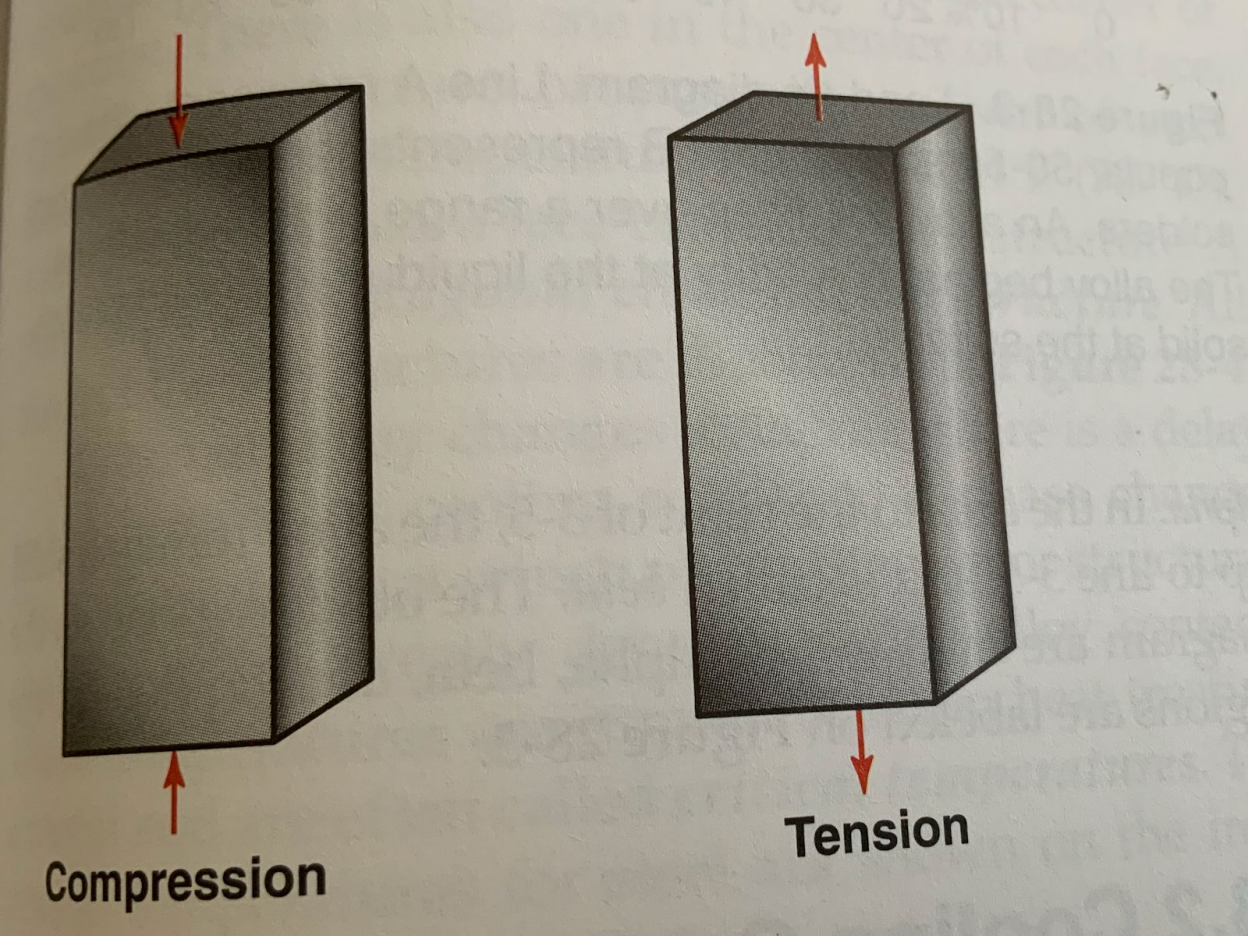
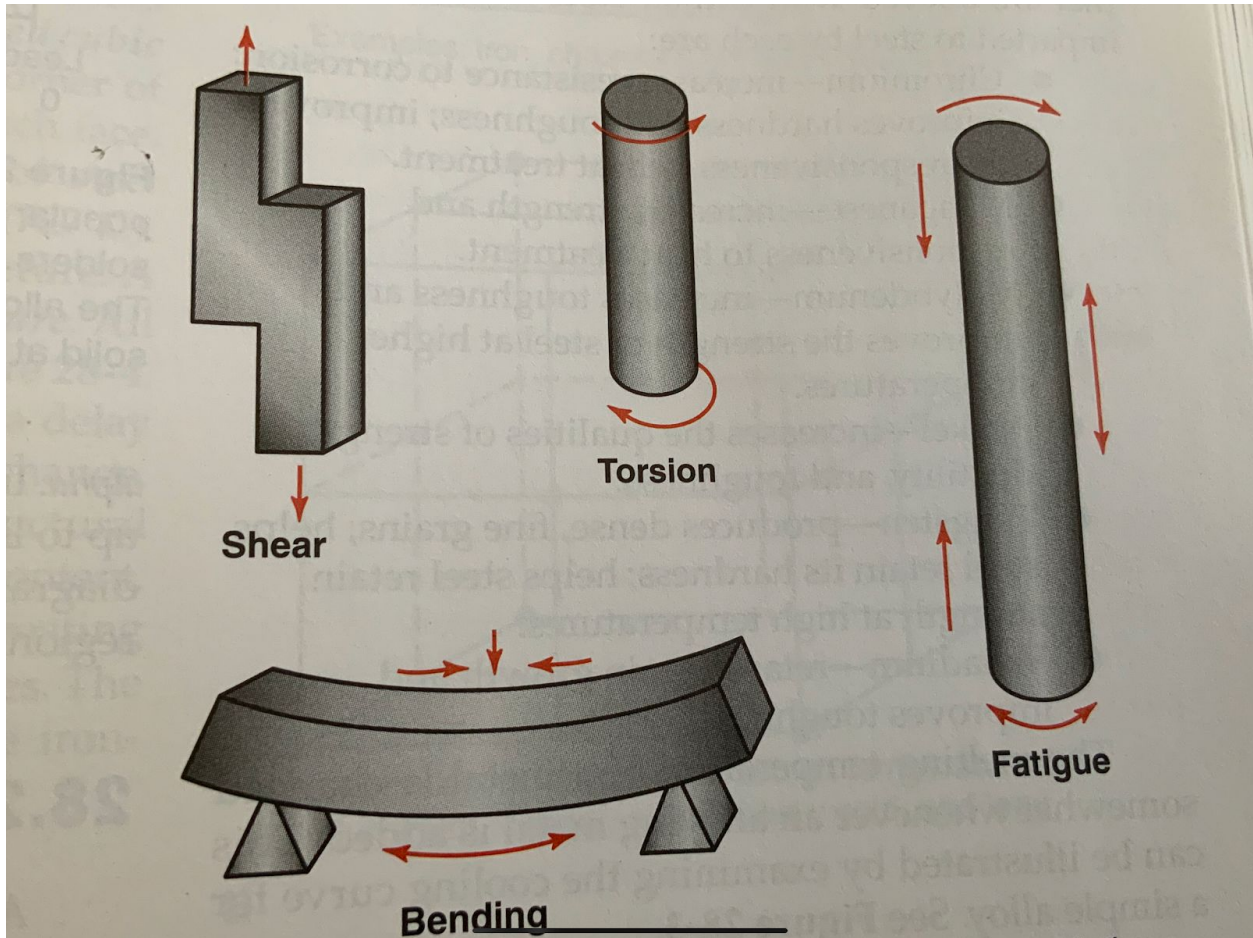


Physical Properties of Iron and Steel

- A physical property is a characteristic that can be measured or observed
- Physical properties of steel are affected by the carbon content, impurities, heat treatment, and metal alloys added
 - The physical properties of steel consist of:
 - **Tensile strength**- the ability to resist being pulled apart. The point at which the metal begins to deform is referred to as the **yield point**
 - **Compressive strength**- measures how much squeezing force can be applied before the metal fails
 - **Hardness**- the ability to resist penetration. The **Rockwell scale** is commonly used to measure hardness
 - **Elongation**- how much the metal will stretch before breaking and is measured during a tensile test
 - **Ductility**- the ability of a metal to be stretched. Also referred to as **formability**, **malleability**, and **workability**. Copper and aluminum are very ductile and can be pulled into wire form
 - **Brittleness**- opposite of ductility. Prone to fracturing (ex. Cast iron)
 - **Toughness**- the ability to prevent a crack from progressing

Types of stresses (loads) put on structures:





In regard to the bending illustration, the bottom surface is in tension while the upper surface is in compression. Regarding the fatigue illustration, a vibration or repeated reversal of the load is applied and the load can be from any of the other forms of stress as well as any combination of them.