**Structural Efficiency**

When designing structures, we are always striving for greater structural efficiency.

**Structural Efficiency** is measured by comparing the highest mass the can support compared to the total mass of the structure.

*For example, if a box that weighs 0.5 kgs can support 10kg before it begins to bend or break, it’s structural efficiency would be 20.*

*How would a box that weights 0.1kg and supports 5 kg compare?*

**Structural Stresses**

**There are 3 states that a structure can be in:**

1. **Stress** – a combination of forces are acting on the structure

\*normal state of a stable / sound structure\*

1. **Fatigue** – a combination of forces \_\_\_\_\_\_\_\_\_\_ structure
2. **Failure** – a combination of forces cause the structure to \_\_\_\_\_\_\_\_\_\_\_\_\_

**\*Sometimes fatigue/ failure can be a part of the design! Example:**

**Individual Structural Fatigue Poster Project**:

• research to find a ***unique*** example of a structure that showed signs of **structural fatigue and/or failure**

• identify the **internal and external** forces adding to the structural stress causing fatigue or failure, and **explain what happened (5 w’s, timeline, evidence, changes made)**

• present the information in a **labelled poster** to be displayed in a gallery or bulletin board display

Assessment – rubric to be discussed / created in class

**Structural Components**

Structures can be simple and made from one piece or component, or may be more complex with many joined together.

|  |  |  |
| --- | --- | --- |
| Name | Picture / Example | Description |
| Arches |  |  |
| Beams |  |  |
| Columns |  |  |
| Buttresses |  |  |
| Trusses |  |  |
| Joints |  |  |
| Adhesives |  |  |

**Struts, Ties & Guys** are other components that can be used to increase stability of a structure.

Research these terms, and draw a labelled picture of each below: