Curiosity Guide #207
Bridges

Accompanies Curious Crew, Season 2, Episode 7 (#207)

Sponge Beam Bridge

Investigation #2

Description

Discover opposing forces that act on bridges!

Materials

- Stacks of hard-cover books, wooden blocks, or inverted cups
- Dry sponge
- Black permanent marker
- Ruler
- Pencil or wooden dowel

Procedure

1) Measure and draw equidistant parallel lines on the sponge so the lines circle the sponge on its short side.
2) Place the stacks of books or wooden blocks so that the sponge spans the distance between the two blocks.
3) Using a pencil or wooden dowel, carefully press down on the center of the sponge bridge so that it is slightly bending. Notice what happens to the lines on the top and on the bottom of the sponge.
4) Did either the top or bottom lines get closer or farther away from each other?

My Results

Explanation

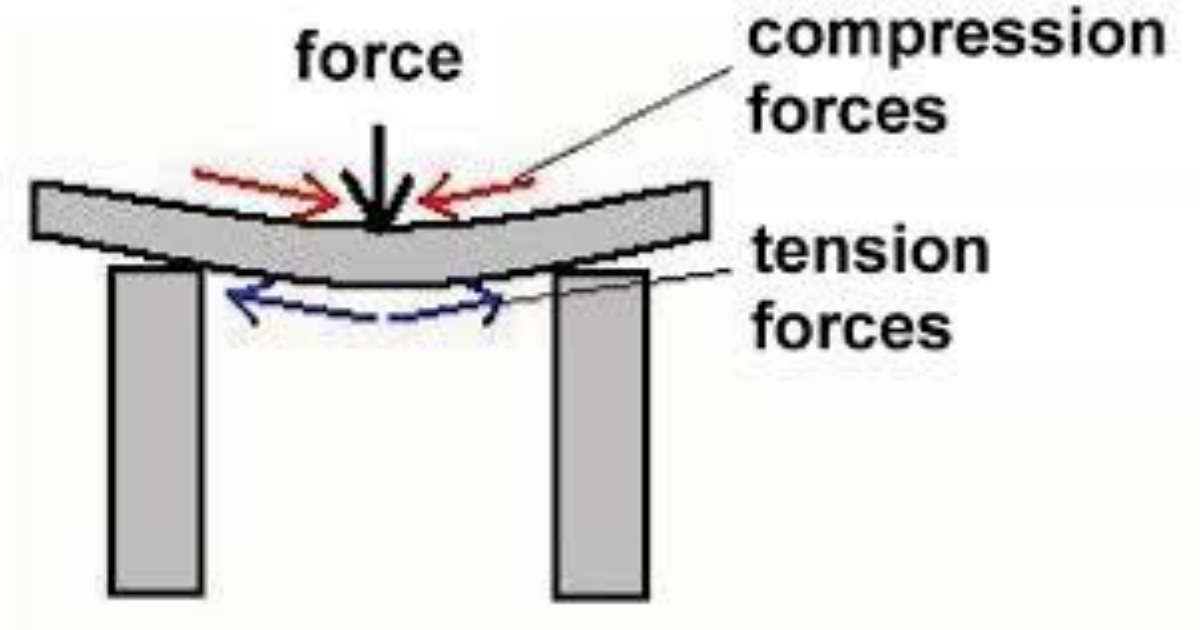
Every bridge has two opposing forces acting on it at all times. These forces are called **compression** and **tension**.

Compression is the force that acts from the ends of the bridge to its center. The force of compression tries to shorten the bridge.

Tension is the force from the center of the bridge going out to the ends. The force of tension is trying to stretch or expand the bridge material.

The lines on the top of the sponge get closer together, showing the compression forces. The lines underneath the sponge stretch apart. The stretched lines show the tension forces pulling to the ends of the bridge.

Something more to think about:



Early people used natural bridges, like a fallen tree as a bridge across a river. However, engineered bridges are really amazing. Every bridge has forces that could cause the bridge to fail. One is the compression force that tries to buckle the bridge. The other is the tension force that could make the bridge snap. Civil engineers have to make sure that the materials they use can withstand those two forces and give us a safe way to cross a bridge. Pretty cool!

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