education

Structures

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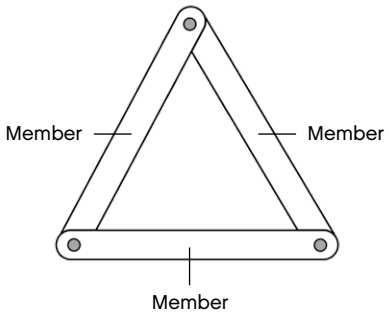
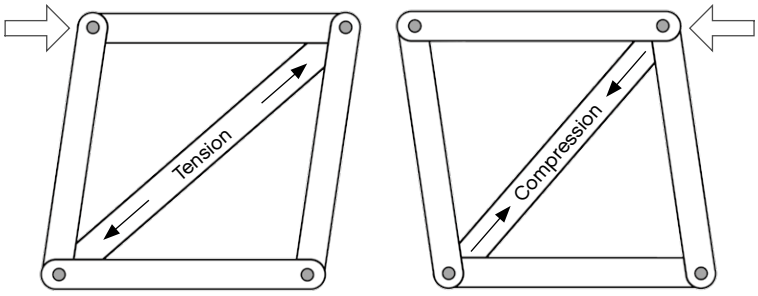
A structure is a construction in which individual parts are arranged to form a whole. All structures are under the influence of external and internal forces. Examples of external forces acting on a structure include the wind or the weight of trucks and buses passing over a bridge. An internal force could be the weight of a roof or the shaking of a large diesel engine on its mountings. Choice of materials will affect the safety level of a structure.

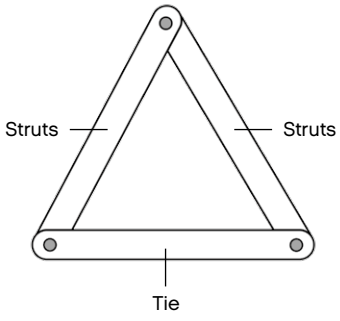
Did you know?
In bridges, cranes, towers and even space stations, triangulation is often used to make structures rigid.



A frame structure is made from pieces called members. This frame is rigid because it is triangulated.



The forces that act on members are called tensile forces or compression forces. Tensile forces will stretch the structure and compression forces will squeeze the structure.

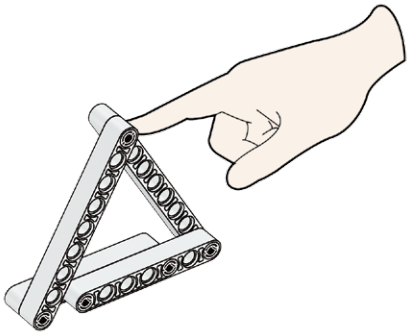


Members that are in tension are called ties; members that are under compression are called struts.

Common examples of structural principles can be found in scaffoldings, buildings and bridges.

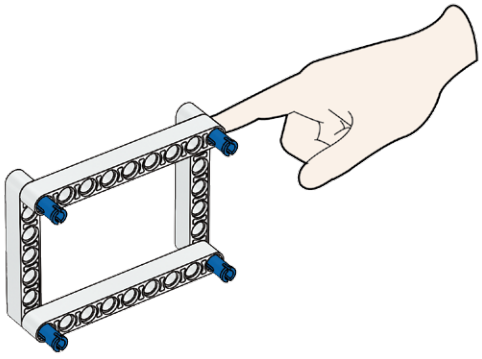
J1

This model shows a triangular structure. When the triangular frame is pushed or pulled the shape doesn't change.
The triangular frame is rigid.



J2

This model shows a rectangular structure. The rectangular frame is easily changed when pushed and pulled.
A rectangular frame is not rigid.



J3

This model shows a rectangular structure supported by a cross member. The rectangular frame is prevented from changing when pushed and pulled by the cross member.
The cross members makes the rectangular frame rigid.