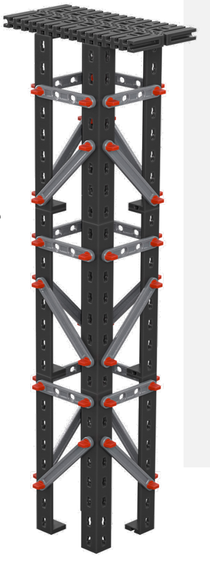
Model 9
Tower

The students receive the building instructions for the construction of the tower.



Date

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DESIGN TASK

Under the corresponding load, the angle beams of the tower twist. This results from the profiles being very narrow in relation to their length. The bending moment in a leg results from the horizontal component of the force acting on the tower.

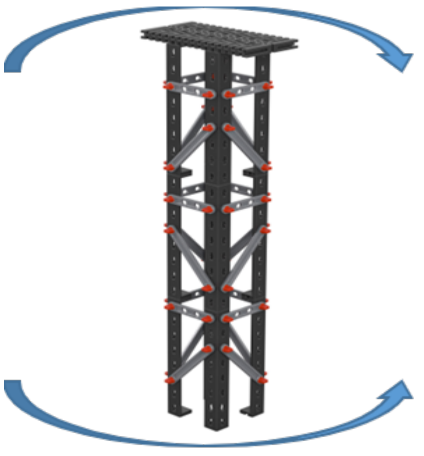
This can be wind or traffic load, depending on the area of application of such a tower. You will also notice that even under vertical load, the legs tend to buckle even at relatively low pressure.

THEMATIC TASK

The static struts prevent the angle brackets of the tower from twisting.

The bracing with static struts allows both horizontal and vertical forces to be absorbed in all four planes of the truss.
The tower becomes stable in itself and can be regarded as a cuboid beam.
The forces that arise in such a beam are greatest at the outermost fibers, which counteract the bending moment. This is exactly where the material is in a truss tower. If it is made of steel, tensile and compressive forces can be absorbed in the same way.

EXPERIMENTAL TASK



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While the supporting structure can still absorb vertical and horizontal forces, the spiral arrangement allows for torsion.

If you hold the tower at the bottom and twist the top plate around its center point, you will see that the structure of the tower gives way under this load. For a real tower, this would not normally pose a risk, as this type of stress is unlikely to occur on a tower.

APPENDICES

Building instructions and templates Models:

Model 9: Tower building instructions.