



2D Paper Trusses for Teaching STEM Topics in the High School Classroom (ROI #2011-01)

Description

- Trusses are constructed of manila folder strips for tensile members, compressive members from paper mat board, connected with aluminum screw post joints.
- Trusses are loaded into a testing apparatus, a frame supporting two pieces of plexiglass or polycarbonate with holes bored to allow trusses of different lengths to be supported.
- A slot in the apparatus allows a vertical loading yoke to be incrementally weighted, identifying the actual failure load.

Advantages

- Ease of fabrication compared to 3D trusses.
- Relative simplicity of theory for 2D trusses makes the material accessible to High School and early undergraduate students.
- Use of paper as a construction material, as opposed to wood, reduces cost per truss, allowing more trials, facilitating small group work.
- Use of pinned joints instead of glued joints keep predicted failure loads more accurate.
- Course notes are available to aid instruction.
- Ability to test different truss materials (i.e. balsa wood, thin metal strips, etc) in a controlled 2D environment, eliminating buckling.

Areas of Application

- Teaching basic STEM topics to K12 students, primarily focused at High School Juniors and Seniors.
- Teaching introductory engineering topics to undergraduate university students.

Patents

- Patent Pending

Publications

- Hall et al, (2010), Work in Progress: 2D Paper Trusses as a Mechanism for Teaching K12 Fundamental STEM Topics, 40th ASEE/IEEE Frontiers in Education Conference, Oct 27-30, 2010, Washington, DC, (<http://fie-conference.org/fie2010/papers/1619.pdf>).