

Quaker Associates Architectural Firm
500 Shaky Street
San Fransisco, California

Dear Design Team:

Welcome to Quaker Associates! We are delighted to have you as members of our Earthquake Structure Design Group. Quaker Associates prides itself on having knowledgeable and creative employees who help us design the very best earthquake-resistant structures in California.

For your first assignment, you will design a building prototype (model) using specified materials. The prototype will be tested on an earthquake simulator, which recreates the types of ground movements that occur during an earthquake.

It is very important that you have an understanding of earthquakes – what they are, how and why they happen, and how they affect Earth and the structures on it. We will provide you with research resources to help you become more informed designers. Pay close attention to the special construction techniques that help make structures “earthquake proof”.

Your prototype must be completed and ready on test day. After the simulation is complete, all design teams will present their prototypes and test results.

Your team will also submit a completed design portfolio at the end of the project. Please keep this portfolio in your designated work folder for the duration of the project, as it will be frequently inspected by your project manager, Ms. Dupree. Specific requirements for the prototype are described on the back of this page.

Your structure will be judged on a variety of factors, including ability to withstand earthquakes without damage, weight-bearing ability, design elements, and visual appeal. You also need to keep budget in mind – the more materials used, the higher the cost of the final building. Therefore, we will weigh each of our “finalist” buildings, and the one that weighs the least will be our overall winner!

Be sure that you continually refer to the design steps and the instructions to ensure that your design portfolio, model, and presentation fulfill all requirements. Constant communication between teammates is important for your success. Good luck!

Cordially Yours,

Mr. Cy S. Mick
Chief Executive Officer
Quaker Associates

DESIGN REQUIREMENTS (PARAMETERS & CONSTRAINTS)

Construction:

- In order to ensure compliance, the structure must be built in our company office (Room 315). No construction may occur outside of Room 315 except under supervision of the project manager (Ms. Dupree). You can use the company offices during class time, or during lunch/before/after school if you make arrangements with the project manager.
- Work areas must be cleaned and all materials must be put away after each work session.

Materials:

- You may use only the materials: supplied by the project manager (Ms. Dupree) to build the structure. Materials: balsa wood sticks, popsicle sticks, washi tape, and cardboard base.
- Tape should be used only at connection points. Tape cannot be wrapped around the structure and cannot extend more than 2 centimeters past a connection point.

Structural Elements:

- The structure must fit on a 10x10 cardboard base, without any part of the building extending off the base. The area of each level must be between 75-100 cm².
- The structure must have 4 levels (including the base). Each level must include a floor that can hold a weight. (The floor does not have to take up the entire space of the level.)
- The structure must be between 30-35 centimeters tall, measured from the bottom to the roof (not including the team flag). Each level of the structure must be at least 7.5 cm tall.
- The structure must be able to support a total of 750 grams of weight, (base 250 grams, 2nd and 3rd levels 125 grams each, 4th level 250 grams.) without buckling or collapsing.
- At least 10 trusses (any style) must be included on the sides.
- Each floor must have at least one open side that a weight can fit through. *Weights will be added to the structure during inspection and must remain on the structure during the earthquake simulation.*
- The structure must have a team-designed flag that includes the team name, a team logo, and at least 4 colors. The flag will fly from the roof of the structure.
- Measure and build very carefully! As the saying goes "Measure twice...cut once".

Inspection and Testing

- The structure must be completed on time, or it will be removed from consideration.
- Structures will be judged on their neatness, building design elements, and visual appeal. Consider the overall "look" of your structure. *The visual appeal (neatness) of your structure will be considered when choosing the top structures to present to our clients.*
- The structure must be able to withstand 20 seconds on an earthquake simulator without breaking, falling, or losing structural integrity (such as a floor tilting or a weight falling). *Structures that break, fall, or lose structural integrity will be removed from consideration.*
- Pay attention to the weight of your structure. The structure should be as lightweight as possible, in order to help our clients save construction costs. *All structures that pass the visual inspection and earthquake simulation will be weighed, and the one weighing the least will be considered the most successful.*