# CALIFORNIA STATE SCIENCE FAIR
## 2010 PROJECT SUMMARY

**Name(s)**
Grant M. Lilya

**Project Number**
**J0216**

**Project Title**
## Roof Truss Designs

**Abstract**

**Objectives/Goals**
My objective for this experiment was to see which roof truss design can hold the most amount of weight and how much the roof truss bends before breaking.

**Methods/Materials**
50) 3/16 x 3/8 x 24 in. basswood; 2) 1/2 x 3/4 x 13 in. pine wood strips; 1) 26 x 12 1/4 in. thick hardboard; 1) Wood glue; 1) Bathroom scale; 1) 12 in. ruler; 1) 12 x .5 in. plywood; 3) 1/32 in. plywood; 4) Tee track tee bolts; 2) Toilet flange tee bolts; 1) Clear packing tape; 6) Tee nuts; 1) Clamp; 2) Stop blocks; 1) 20 x 4 7/8 in. plywood; 1) Drill press board; 1) Stapler with staples; 2) Bar clamps; 1) Coping saw; 8) Nails; 1) Table saw; 1) Framing square; 1) Pencil.
After building all of the five types of trusses, I built a jig made out of 2 stop blocks, a drill press board, a 2 x 6 shaped to go around the exterior of the truss, a bathroom scale, bar clamps, and 2 more 2 x 6 cut in half. This jig will compress pressure on to each truss distributing the pressure evenly through the whole truss. Once the truss breaks, look at the scale to see how many pounds of pressure got put on the truss.

**Results**
From the experiment, "what type of roof truss can hold the most weight," the modified howe roof truss held the most amount of weight at an average of 261.4 pounds. Following very close with an average of 261.2 pounds was the howe roof truss. Then the fink roof truss held an average of 240 pounds. Following the fink, the queenpost held an average of 227.8 pounds. Last but not least, the kingpost held an average of 171.8 pounds. The results for how much each truss bends before breaking were the Fink at 8 mm, queenpost at 7 mm, modified howe at 5.6 mm, the howe at 5.2 mm, and the kingpost at 5.2 mm.

**Conclusions/Discussion**
The end results were very close but the modified roof truss held the most weight at an average of 261.4 pounds beating the howe roof truss by .2 pounds. Today, roof trusses are used when building new houses or buildings. When building a house or building, you have to incorporate some type of roof truss to support your roof. As you walk in your house, you are relying on your roof trusses because they keep your roof from collapsing. That is why I did this experiment so people know what types of roof trusses will hold the most weight for safety reasons.

**Summary Statement**
I tested to see which type of roof truss can hold the most weight

**Help Received**
Dad heped me build some of the trusses