What glue should I use?

**Toothpick Category Bridge Requirements**

Materials: Wooden toothpicks and glue

Span = 16.625 inch

Length = span + 2 × bearing width

The bridge can weigh ≤121 grams.

Bridge type: Suspension bridge not allowed

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**The specifications say that the bridge must span 16 5/8 inches; how long should the bridge be?**

The specifications don’t give a design load; how much weight can a toothpick bridge this long support? It just says glue; what kind of glue should I use?

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FWM concluded that waterproof PVA and carpenter’s PVA were the strongest of the glues that they tested.


The Fine Woodworking Magazine experiment didn’t test white glue (PVA) or superglue or hot melt glue or the wood itself.

In the manufacturer’s datasheet, the measured shear strength for waterproof PVA glue is 4900 pounds per square inch on hard maple with 37% wood failure.

The median breaking force was less than 25 pounds every year except for three years.

The median breaking force was always less than 34 pounds.

However, prior to 2005, there were often bridges that held almost 100 pounds or more.

Some held as much as 140 pounds.

**Last year, many teams used hot-melt glue; is that the strongest glue to use?**

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In the manufacturer’s datasheet, the measured shear strength for hot-melt glue is 433 pounds per square inch on pine.

How strong is white glue (PVA) or superglue (Cyanoacrylate or CA) or hot-melt glue? How strong is the wood?

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**How Strong Is Your Glue?**

**Your Glue?**

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**Experiment Design**

**Specimen Design & Fabrication**

**Bonds in Shear by Compression Loading from the American Society for Testing and Materials.**

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**Variation in amount of wood failure PVA Type I**

**Specimen BB**

**Specimen F**

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**Preliminary Observations**

Given the size of the standard deviations relative to the difference between means, additional calculations are required to state the confidence that one glue is stronger than another.

Comparison of means tests suggest that strength of the three PVA glues are indistinguishable from each other and from strength of wood.

PVA is stronger than CA which is stronger than hot-melt glue.

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