

SELMON EXPRESSWAY BRIDGE DESIGN COMPETITION

Materials Information Sheet

1) Materials

i) Balsa Wood

(1) Definition: Any wood made out of Balsa Wood. The Maximum size of the balsa wood used to construct bridges is $\frac{1}{4}$ " x $\frac{1}{4}$ ".

(2) Suggestions:

- (a) Pieces of a smaller dimension can be used to economize the weight.
- (b) Large pieces can be created by the bonding of piece from gluing

ii) Glue

(1) Definition: any liquid adhesives.

(2) Suggestions:

- (a) ZAP-A-Gap, or cyanoacrylates, is a strongly suggested glue to the fast drying time (≈ 30 sec), however, are usually more expensive.
- (b) Regular household glues like Elmer's, can be used however drying time is excessively longer ($\approx 30 - 45$ min) and would usually have to be clamped or held together until the glue is dry.

(3) Removal: It is important to have a glue remover or unbonder on hand. Store bought can be used, and sometimes nail polish remover works.

2) Weight

i) Balsa

(1) Definition: The weight of balsa wood varies from make to maker. However, an average can be calculated using scale and pieces of the balsa wood

(2) Suggestions:

- (a) You would take 1 inch samples of balsa wood from 3 or more sticks and weight each one. Add up all of the weights and divided the total from the amount of pieces weighed. This will give you the weight per inch for that size piece.
- (b) From our measurements, the wood we provided is usually:

Size (cubic inches)	Grams per 3 feet	Grams per inch
$\frac{1}{4} \times \frac{1}{4} \times 36$	5.50	0.153
$\frac{1}{4} \times \frac{1}{8} \times 36$	4.74	0.132
$\frac{1}{8} \times \frac{1}{8} \times 36$	2.00	0.056
$\frac{1}{4} \times \frac{1}{16} \times 36$	2.40	0.067

ii) Glue

(1) Definition: It is to note that 1 ounce (OZ) is the equivalent of $\frac{1}{16}$ or .0625 pounds (lb.)

(2) Suggestions

- (a) If you bought an 18 oz. bottle of glue and it looks like used half of the bottle, you have probably used 6 oz. or 0.375 pounds of glue
- (b) Or you can estimate that the glue will be $\frac{3}{17}$ time the estimate weight of your wood.

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3) Building Materials

a) Things that can be purchased from

i) General Store (e.g. Dollar Tree)

- (1) Pencils: used to draw the layout of your bridge and basic calculation or noting parts
- (2) Markers: Can be used to mark pieces of the balsa or used in sketching the placement on the wax paper
- (3) Wax Paper: Use in place of a barrier from the surface and the bridge so that glue does not get into contact of said surface
- (4) Straight pins: used to hold pieces of the bridge together during construction
- (5) Nail polish remover: used as a glue remover or debonder
- (6) Sealable plastic bags: used as so you can store things for later
- (7) Rubber bands: can help in the binding processes
- (8) Foam board: used as a surface to hold the bridge parts flat and is portable in case parts are still drying but you need the table space

ii) Hobby Shop/Craft Store/Home Store

- (1) Modeling Saw with Fine Blade or X-Acto knife: used to cut the balsa
- (2) One miter box for modeling saw
- (3) Small bottle of cyanoacrylate glue (super glue)
- (4) Metric scale or ruler
- (5) Straight edges and triangles: for drawing
- (6) Scale for weighing bridge (electronic or postal type)
- (7) Balsa wood