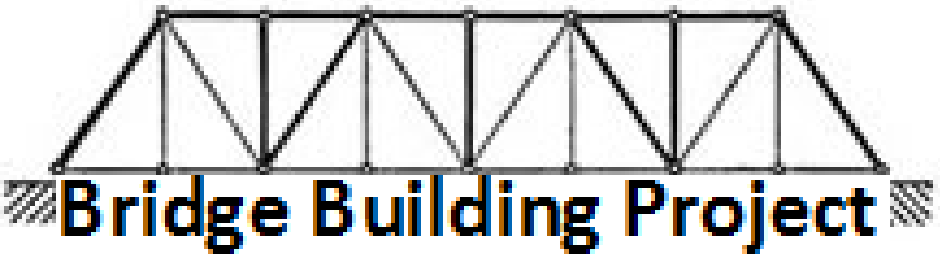

Objective: The object of this project is for a ***team of two*** to design and build the lightest bridge with the greatest structural efficiency capable of supporting a load of up to 15 kg over a span a 25cm.

Structural efficiency = Maximum weight held by bridge kilograms / Mass of bridge in kilograms

Materials: The bridge is to be a single structure ***constructed of wood and glue*** supplied by Mr. Buck. No other materials shall be used. The entire bridge must be constructed of pieces of wood ***no larger than 1/2 cm*** high or wide in cross section.

Design: A ***full scale drawing*** must be made and ***show the external and internal forces*** acting on the bridge assuming it ***withstands the entire 15 kg load***. This will resemble a free body force diagram showing reaction forces and member forces at each joint.

Construction: Sound engineering, ***static determinant*** (2 J = m+3), and construction practices such as trusses, mitered joints, corners, and gussets are encouraged. The bridge must ***span an opening of 25.0cm*** and have a ***width of at least 5cm*** along its entire span. The load point (P) will be in the middle of the bridge.

Testing: All bridges will be impounded before the start of the competition. No alterations to the bridge will be allowed once the bridge has been impounded. One person wearing safety googles from the team will be allowed to add sand to the bucket until the bridge fails or reaches the 15kg limit. Average structural efficiency of a bridge is 750.

Balsa Wood Bridge Rubric					
		4	**3**	**2**	**1**
Design	Scale	Drawing is to 1:1 scale	Drawing is to scale	Drawing is not to scale	Drawing is not to scale
	Lines	Lines are straight, neat, and clean	Lines are neat and clean	Hand drawn lines	Lines are not well drawn
	External Forces	forces are shown and labelled correctly on F.B.D.	Forces are shown and labelled	Forces are shown	Forces are missing
	Internal Forces	forces are shown and labelled correctly	Forces are shown and labelled	Forces are shown	Forces are missing
Construction	Truss	Trusses look identical No excess glue	Trusses look very similar No excess glue	Trusses are alike Excess glue	Trusses are different Excess glue
	Static Determinant	Static determinant and stable 2 J = m +3	Static determinant	Not Static determinant	Not Static determinant Not stable
	Span	25cm span fits landscape draw	25cm	Not 25cm	Not 25cm, doesn't fit draw
	Width	5cm width and fits load tester	Close to 5cm width	Not 5cm width	Not 5cm width, load tester doesn't fit
Testing	Load Test	Held 15 kg	Held at least 10kg	Held at least 5kg	Held its own weight
		36-31	30-25	24-20	19-0

Score _____/ 36