The Welding Institute

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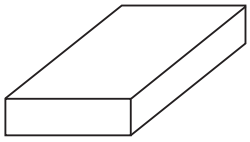
WELDING with CHOCOLATE

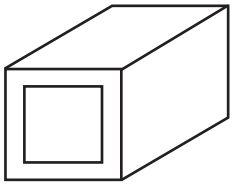
BRIDGE BUILDING - Bridges are made of all kinds of **materials**, wood, stone, steel, bamboo or concrete. The best material is the one that is cheaply available, and which will perform its required function.

The simplest bridge is a plank that spans the distance to be crossed. A box girder bridge is made from a long beam in a box shape instead of simply a plank, and the box shape makes the beam much stiffer.

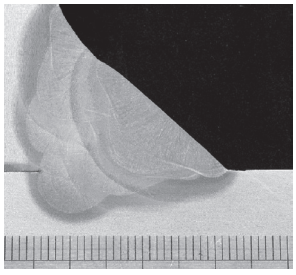
Bridge



Plank



Box girder

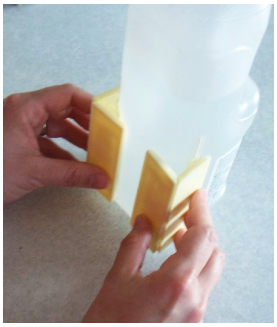


Fillet weld

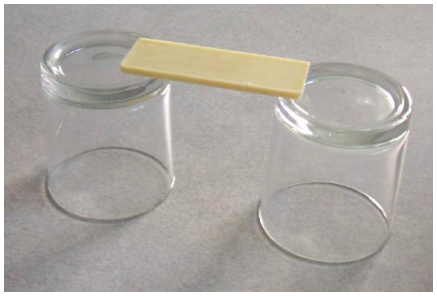
Welding your chocolate box girder bridge

You can use welding to make a chocolate box girder bridge from single bars. The heat source we use is hot water (from a kettle) in a bottle.

1. Hold the edges of your chocolate bars against the bottle of hot water until they melt slightly.
2. Press the melted edges together in a right angle, and leave to cool. This is half the box section. Make another half-section in the same way.
3. When the half sections have cooled, melt the remaining long edges and press them together to form the box section. Leave to cool for at least 20 minutes, or put it in the fridge.



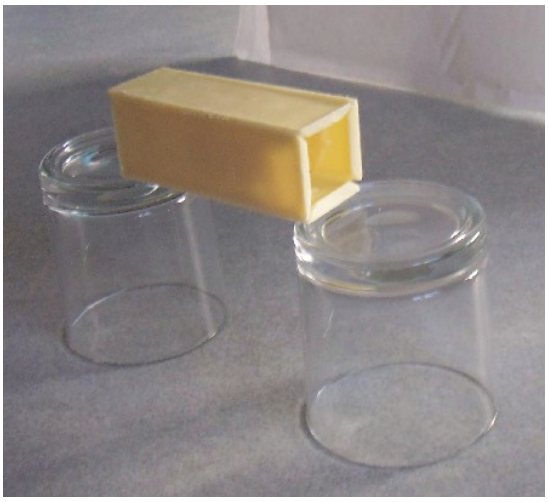
Experiment 1 – Chocolate Plank Bridge



See how strong a plank bridge is. Unwrap one chocolate bar and place it between the two span points.

Now begin to load your bridge, carefully adding a little at a time. You can use weights if you have them, or load coins into a yoghurt pot. Just make sure that the bridge is loaded in the free span part of the bridge. How much load have you added when the bridge breaks? Does another chocolate bar break at the same load?

Experiment 2 – Chocolate Box Girder Bridge



Once your box girder has properly cooled and solidified along the edges then it's time to test it. First take some time to look at your box girder. Has it melted and joined perfectly all along each edge? Are there places that haven't stuck or holes along the joins? Is there some distortion so that the beam is not a perfect square in section? Do you think these factors might affect how strong the bridge is?

Place the box girder bridge between the span points the same as the plank bridge. The box girder is made from four bars so it ought to hold at least four times the load that the plank bridge broke at, right? Does it?

How much more load can you add to your box girder bridge compared to the plank bridge? If you manage to break the bridge, how does it break? Were the welds the weak points of the bridges that broke? Imagine how much stronger they would be if the welds and joints were perfect quality.

Question…Why is your chocolate box girder bridge stronger?

To find out more about materials and joining or careers in our industry contact us at…

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