



'Its in the bag'
Appropriate technology project
Design and make.

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Appropriate technology defined

Appropriate technology must meet the following criteria:

- Enables people to further their own standards of living
- Uses local skills and materials as much as possible
- Is affordable by those who it is intended for
- Can be improved, managed and controlled by local people
- Has a limited impact on the environment

Objectives

- Design a product within the definition of appropriate technology for sealing plastic bags on a medium scale
- Make the product as safe as possible, whilst still reducing seal time and increasing seal quality.
- Build and test a prototype, redesigning as required
- Produce a set of plans to be easily followed using the simplest of tools, materials and skills

What's the problem?

- Food storage in the developing world is obviously very important as without a safe and reliable methods, standards of hygiene can be low.
- Many people in the developing world now have access to plastic bags, and they are widely used for storing food and packaging manufactured products.
- Research through 'Footsteps magazine' and on the 'ITDG appropriate technology web site' have highlighted a real need for a safe and reliable method of sealing such plastic bags on a medium scale.

Existing developing world methods:

- According to ITDG, the most common method uses a candle and a knife or hacksaw blade.
- After the contents is placed in the plastic bag, the open end of the bag is folded over the knife edge.
- The knife edge is then run over a **naked** flame.
- The heat from the flame melts the two walls of the bag together which produces a seal.

What's the problem?



Sealing plastic bags with a candle and hacksaw blade

What's the problem?

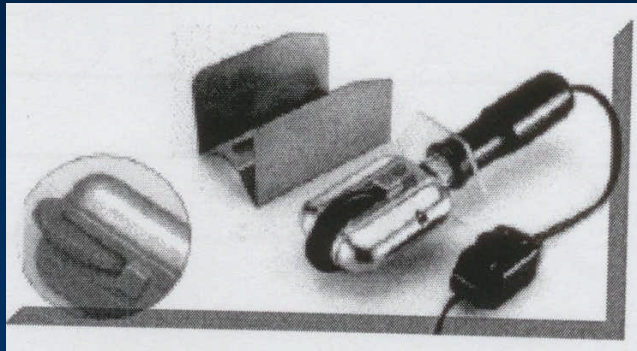
So what are the problems with this method?

- Fire hazard
- Burns
 - Directly from candle
 - Molten wax or plastic
- Slow
- Poor seal, consequently poor food preservation

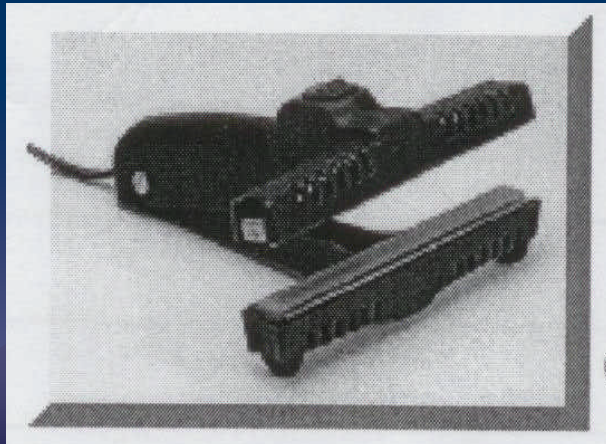
Existing products

Existing products fall into three main categories:

Heated rollers



Heated clamps



Heated scissors

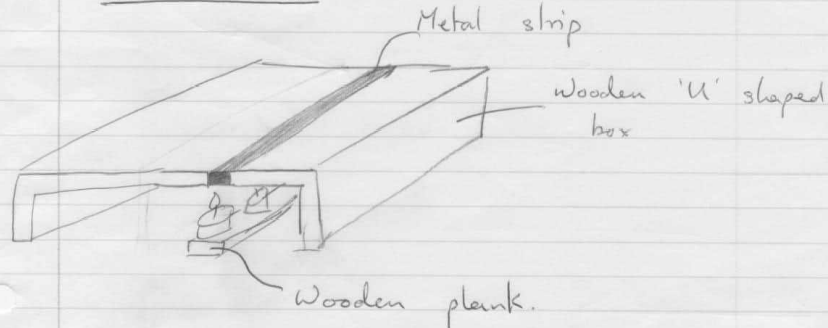


Conceptual ideas

- Block sealer
- Hot strip
- Friction sealer
- Heated roller
- Strip resistance sealer

Conceptual ideas

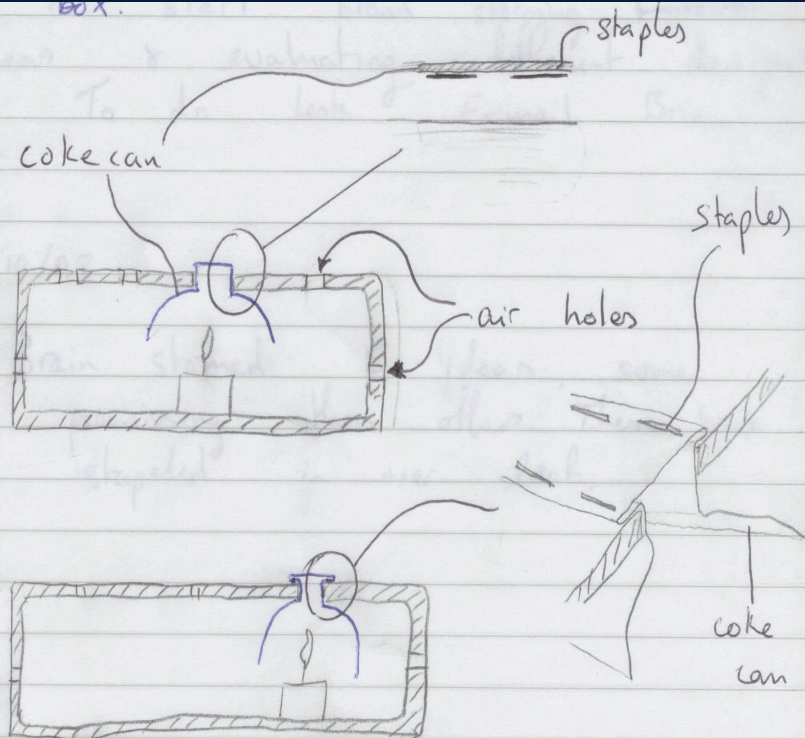
② HOT STRIP



cross-section →



N.B. candles can be removed on this wooden plank easily for replacement. If a hotter temperature is needed a thicker plank can be used, thus ~~moving~~ moving the flame closer to the metal strip.



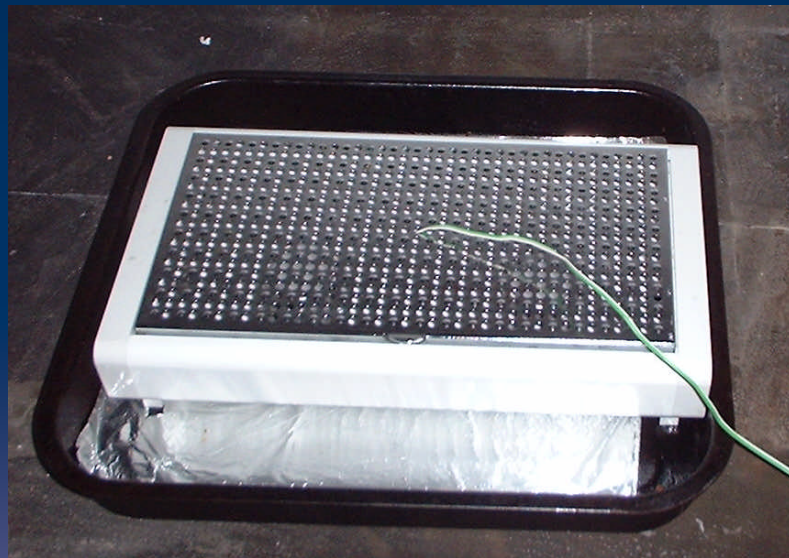
OR

* Eventually settled on this design.

Experimental results

Before a prototype was built the basic assumptions that the design relied on were investigated.

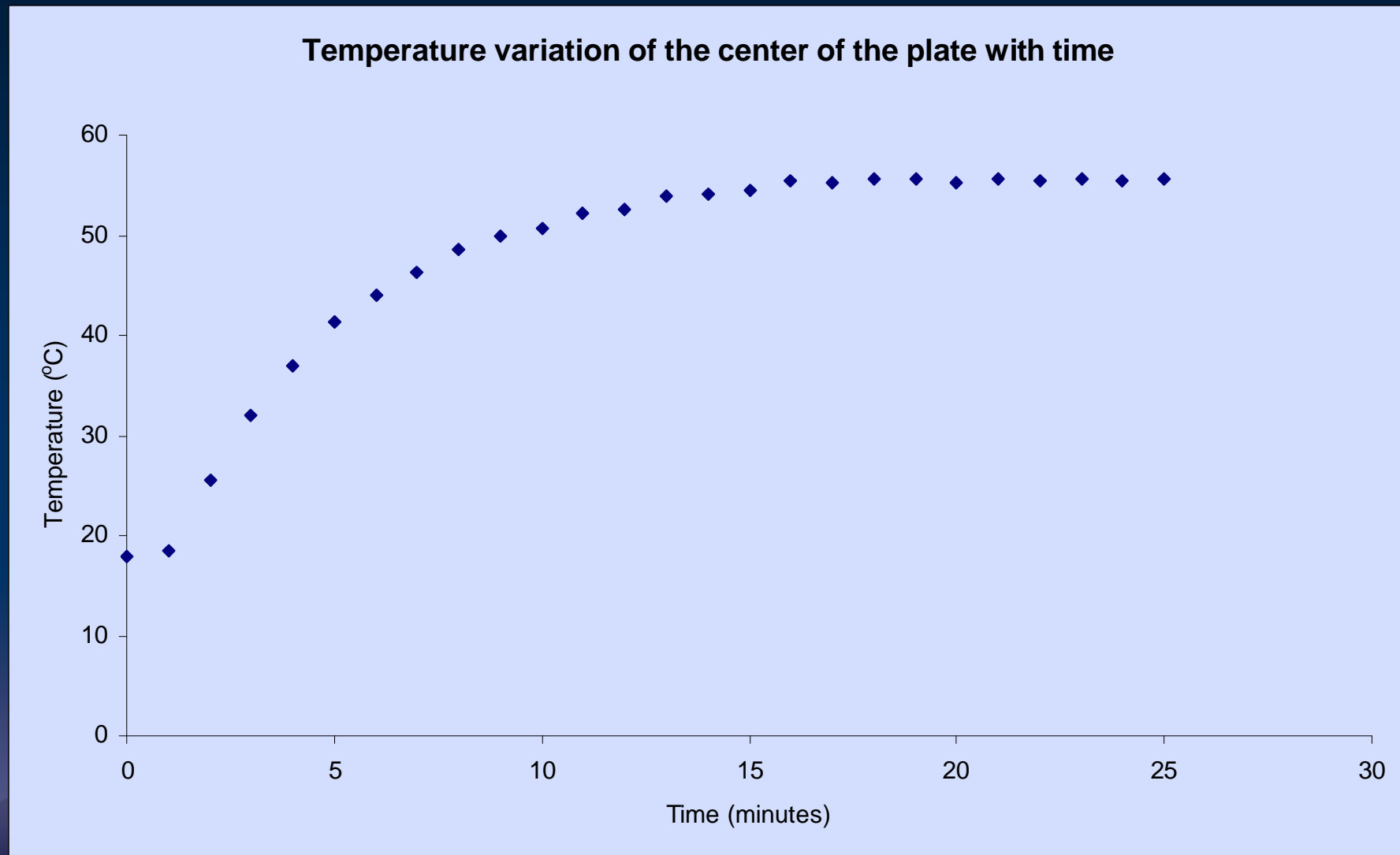
Hot plate



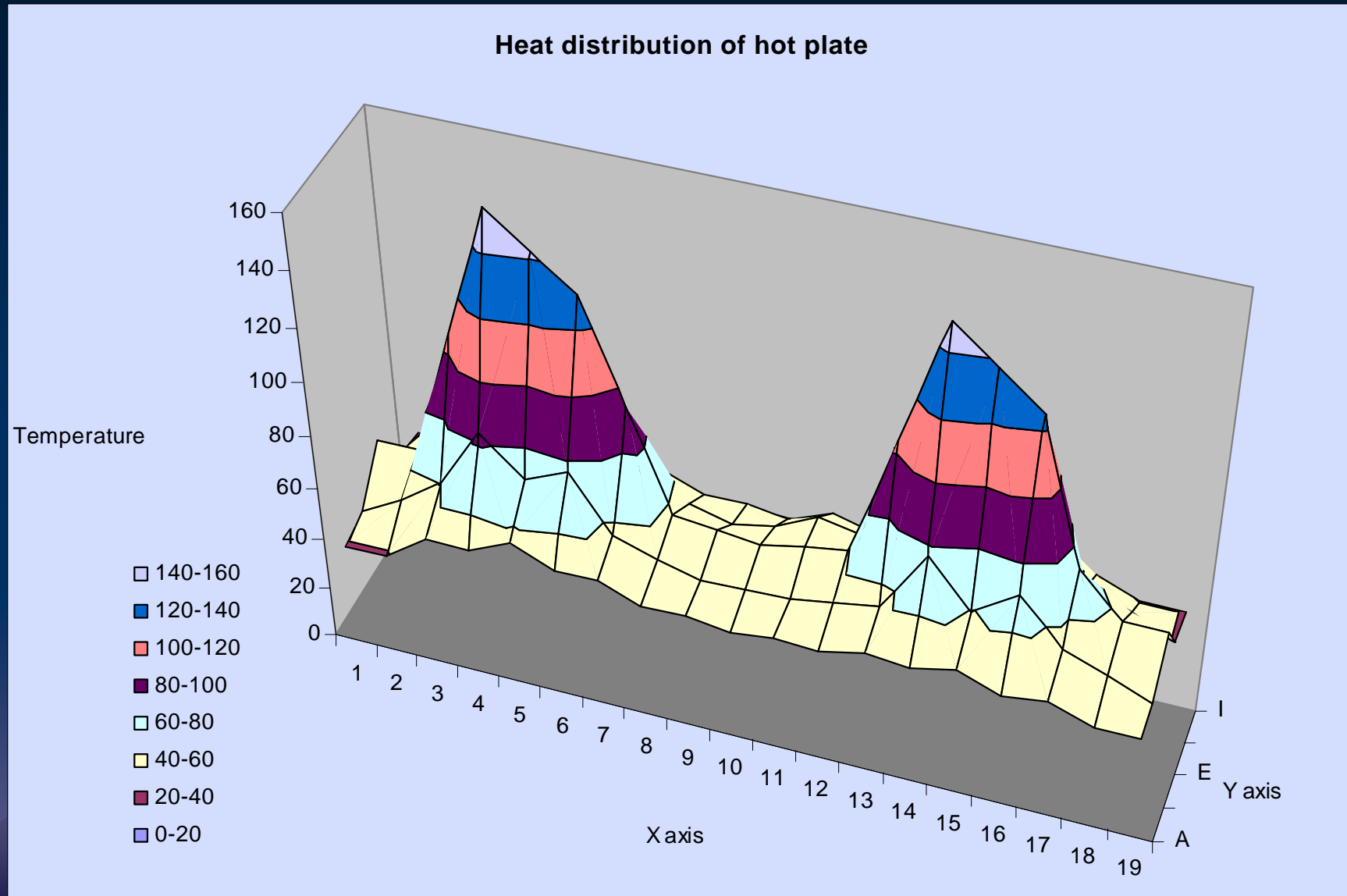
Metal drinks can



Hot plate testing

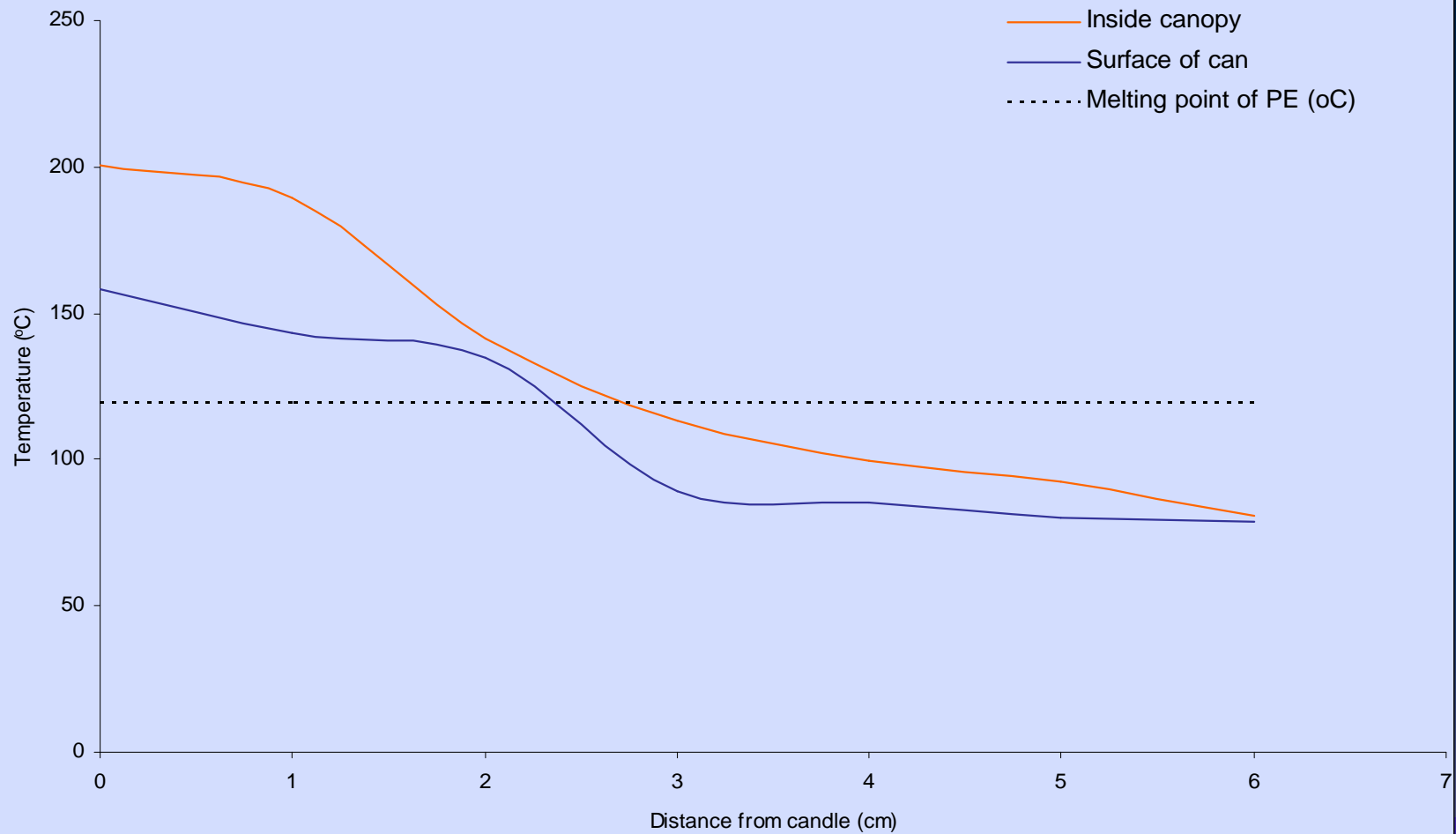


Hot plate testing

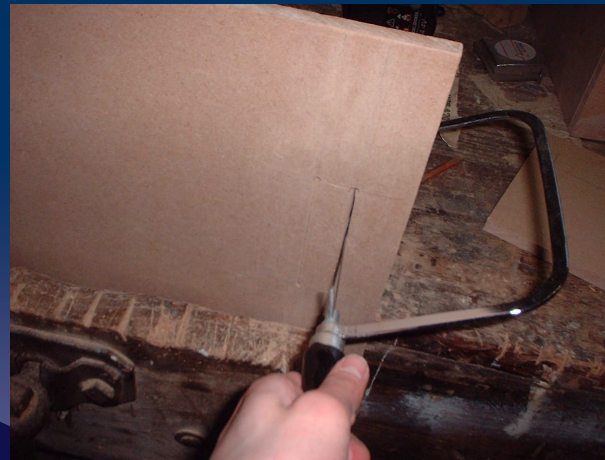
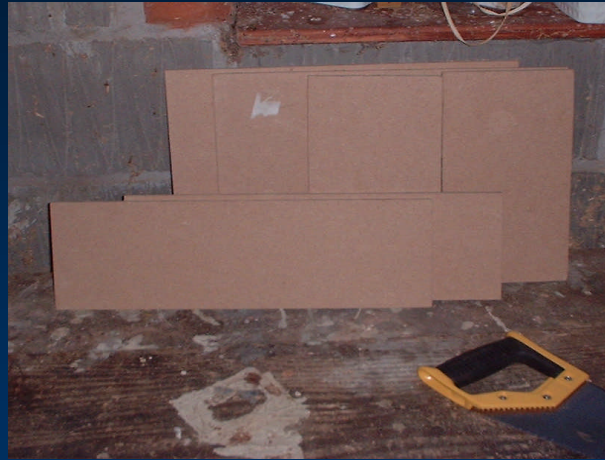


Testing of can metal

Investigation of the effect of a tin roof on heat distribution



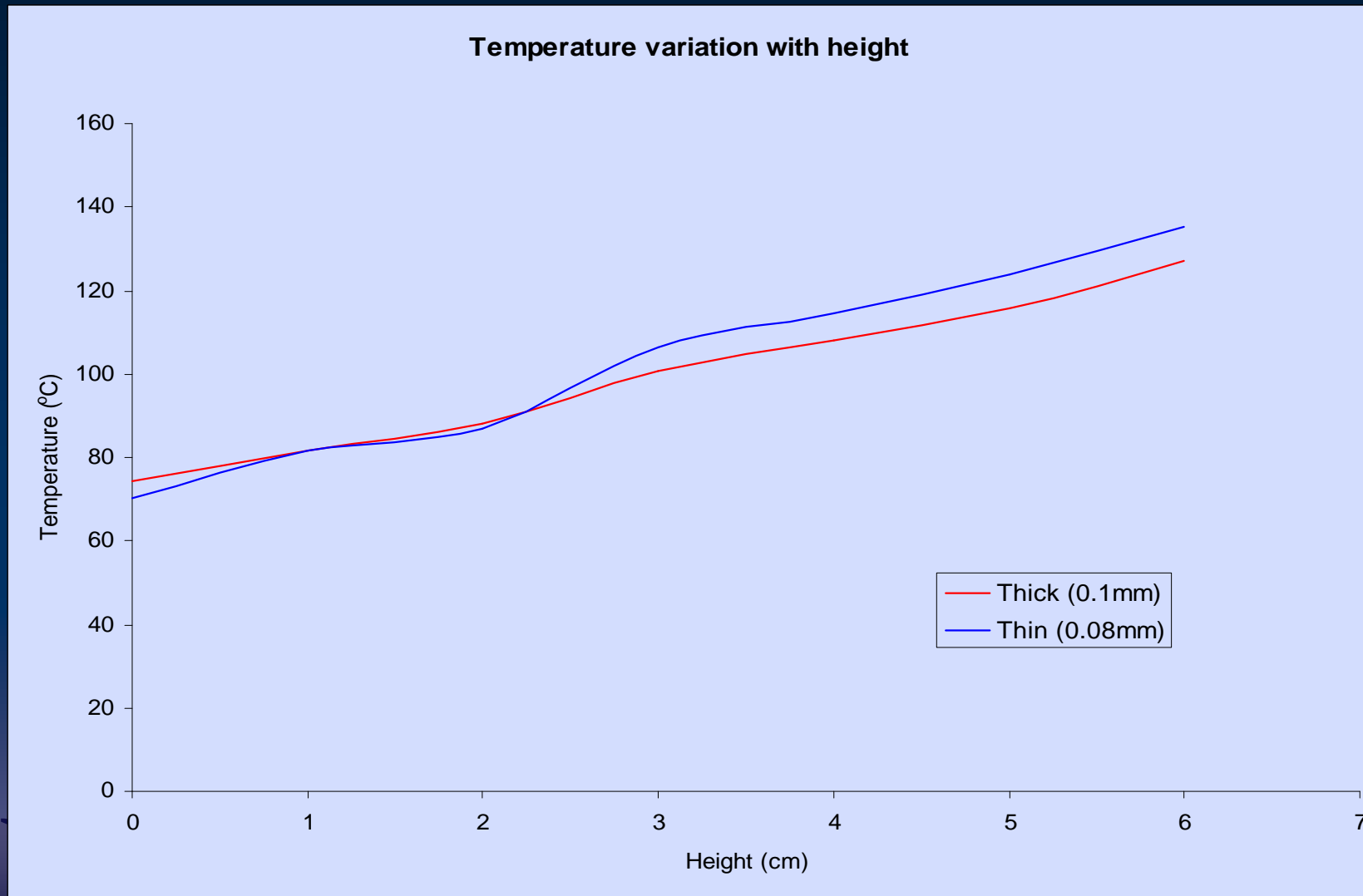
Building of prototype



Building of prototype



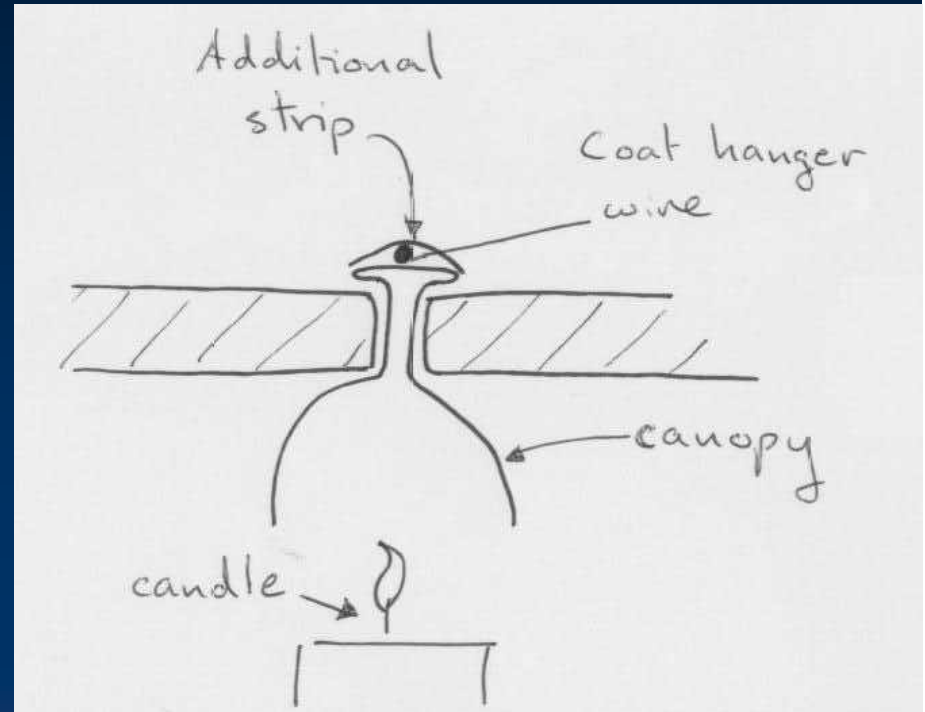
Testing



Redesign

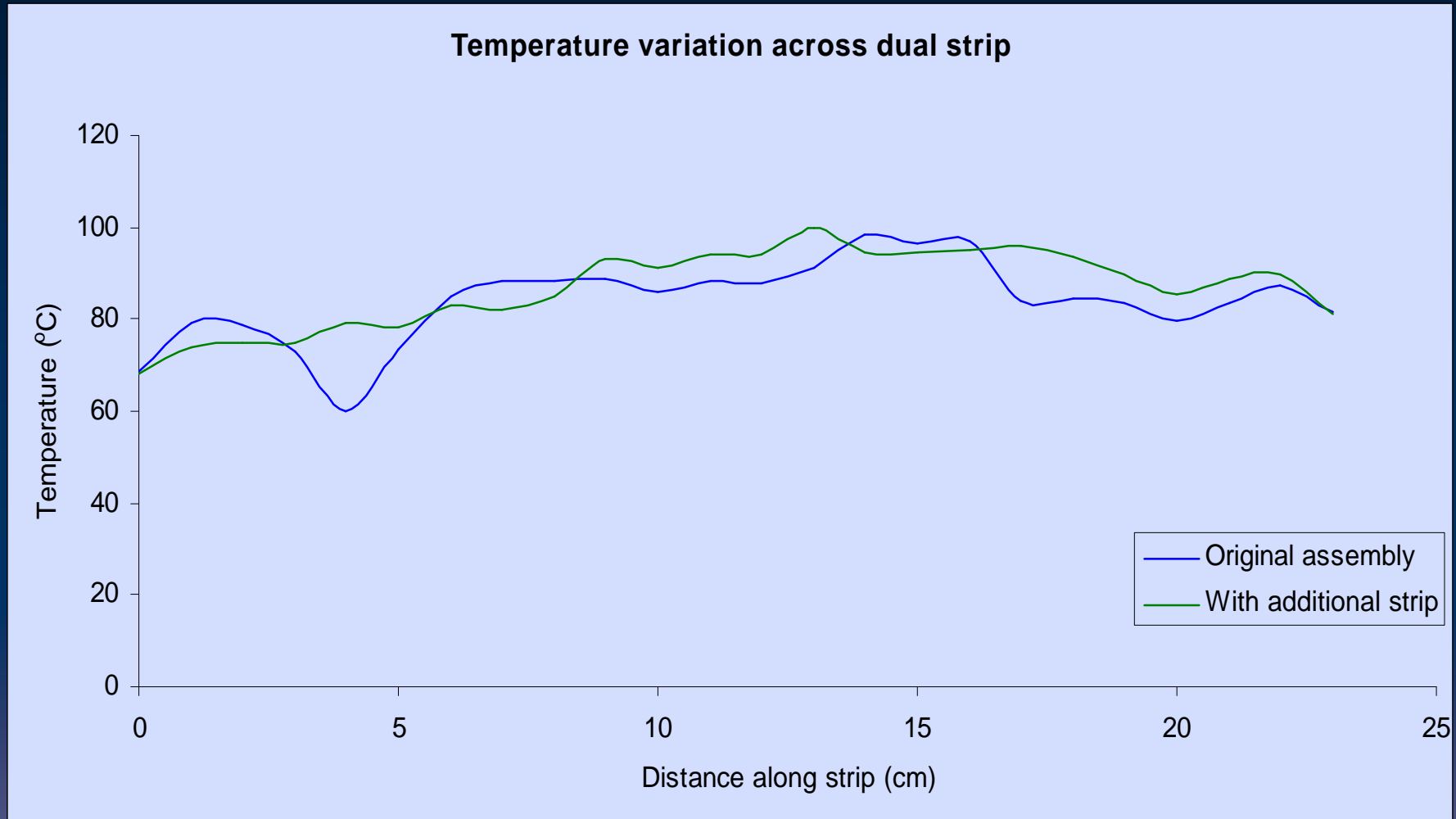


Additional strip used to hold canopies in place and even heat distribution.



Testing revealed that with this adjustment, the sealer took over 45 minutes to warm up!

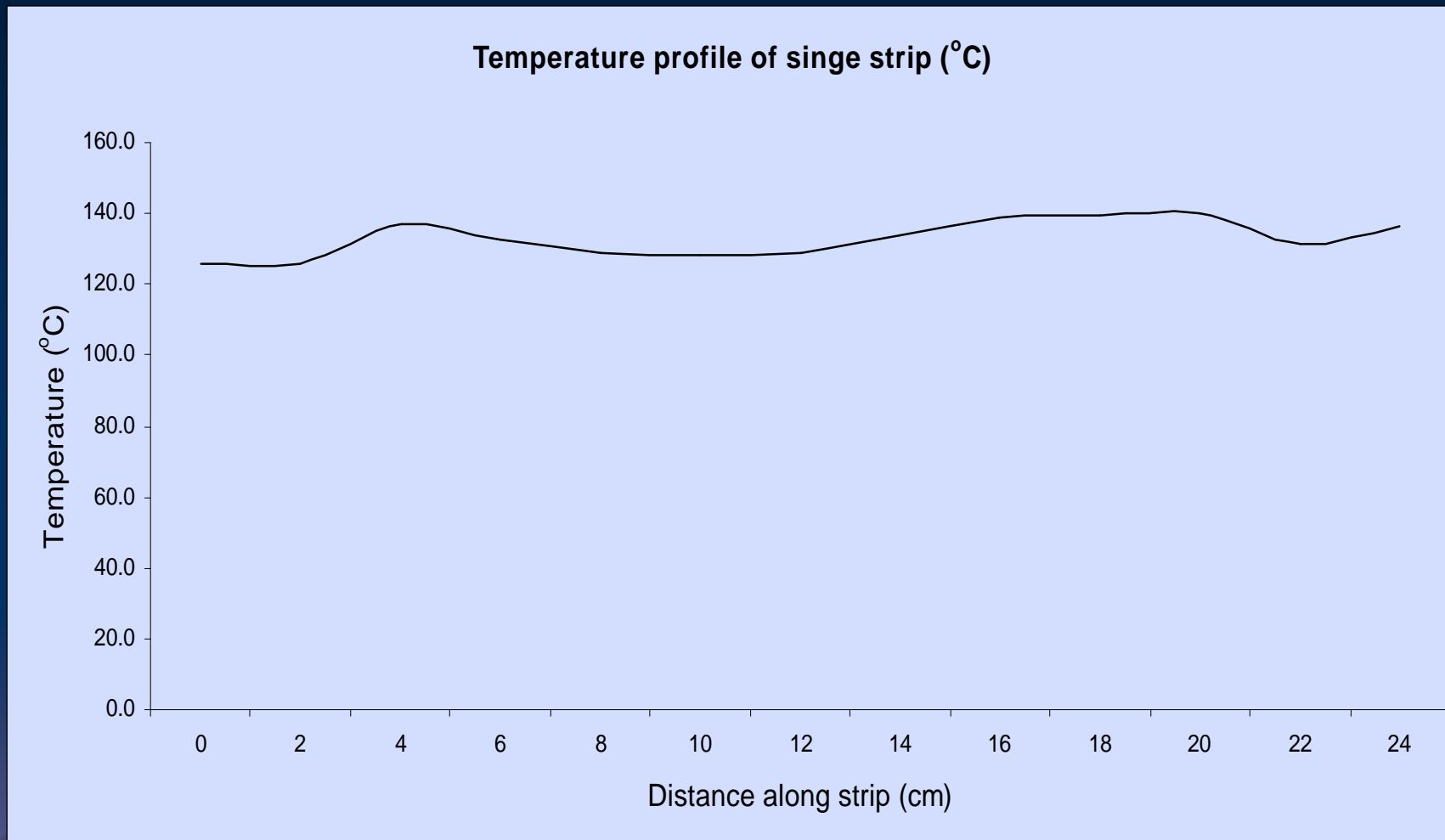
Testing



Redesign



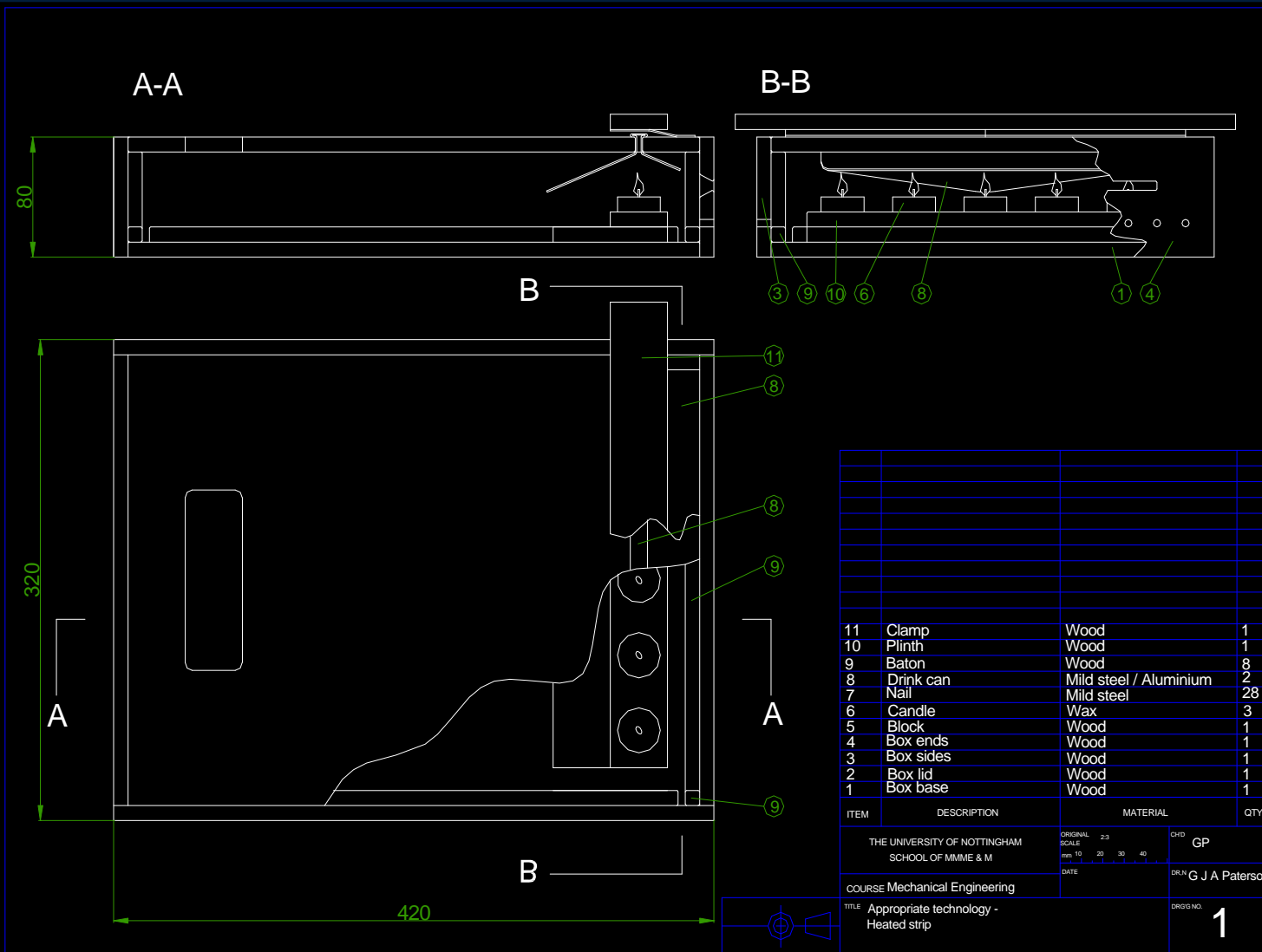
Testing of final design



Final Design



Final CAD Design



Plans

The plans were converted to PDF format (See hand out) and e-mailed to

- Nagpur, Central India
- Medellín, Colombia
- Soroti, Uganda
- Nairobi, Kenya

They had also been sent to the ITDG web site, hope fully to be included in the web site.

End