

COSY COMPOST

Design and Build an Insulated Compost Bin

For Incredible Edible Bristol

William Holmes, Paul Trimble, Elisabeth Woeldgen

INTRODUCTION

Incredible Edible Bristol (IEB) is a community project with the mission to increase the number of people growing their own food [1]. To do this they have education sites at a number of allotments around Bristol and run workshops to teach people the fundamentals of gardening, enabling them to grow their own produce.

One skill that IEB would like to teach in the future is composting. This is the practise of decomposing organic matter to recycle nutrients that can be spread over growing plants. Composting is an ongoing exothermic reaction and the thermophilic stage (40–60°C) is when decomposition is the fastest [2]. During the colder months the temperature of many compost piles decreases and hence the rate of compost production also decreases. Therefore by insulating a compost heap it is thought that decomposition can occur all year round.

Currently, there are expensive insulated compost bins on the market that are not accessible to all. A project was conceived UWE to create an insulated composting method using only reusable material. Thus, encouraging sustainability and keeping the cost of composting down.



Figure 1: The team at an Incredible Edible Learning Space

PROJECT OBJECTIVES

The project was initiated by meeting with a representative from IEB to discuss the brief and decide on the deliverables expected by the end of the project. The initial project brief was to create:

1. An instructional video demonstrating how to build an insulated compost bin from only recyclable materials.
2. An instructional leaflet to accompany the video, providing extra information to those building their own compost bin.

These deliverables were signed off by IEB on a project initiation document and it was agreed that all communication between the group and IEB would be via email through one team member. A preliminary deadline of 12th July was agreed for the delivery of the leaflet and video.

To manage the project a Gantt chart was created to highlight the key milestones with preliminary timings. This document evolved throughout the life of the project as new tasks were discovered that required completion. A project risk assessment was also completed to assess the project and personal risks associated to the project.

RESEARCH PHASE

The first activity undertaken in the research phase was the creation of a market research survey to learn about the current interest and ability level of the target audience of the instructional video. The survey consisted of 14 questions and was distributed via the Incredible Edible Bristol Facebook page. The Survey received 248 responses, providing a large quantity of data to draw conclusions from to assist the design decisions of the video and leaflet. Figure 2 shows an example response from this survey.

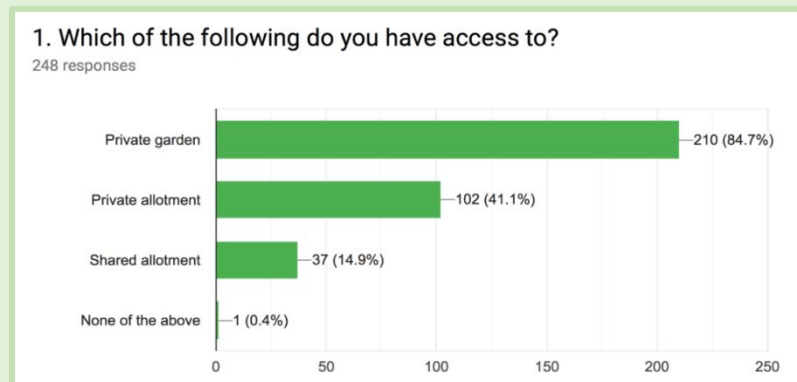


Figure 2: Survey response example

The next stage of the research involved finding some suitable materials for the compost bin. Part of the brief was that the materials must be recyclable. A brainstorming session led to the creation of a list of common household materials that could be used as insulation and compared against Rockwool insulation material.

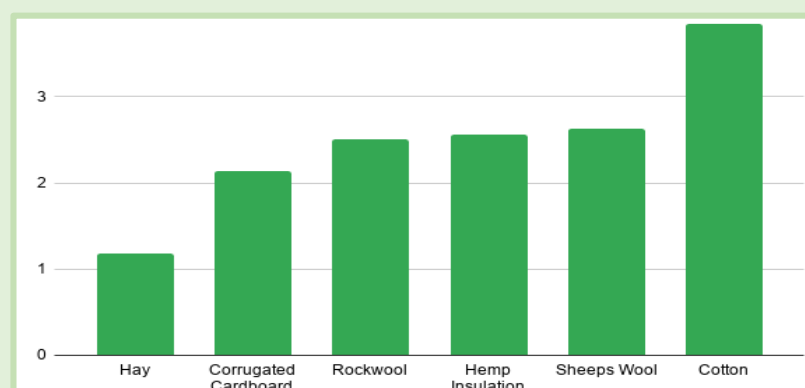


Figure 3: Insulation R Values

Three different insulation materials were included for the prototype design. Old clothing, cardboard and hay were chosen as they are all very common materials that often go to waste. To protect these materials from the elements, each material was encased in a sealed plastic bag.

The final stage of the research phase was to look into currently available compost bin designs and assess their effectiveness [3]. A search was undertaken for commercially available bins as well as bins currently situated in local allotments. An infrared camera (Figure 4) was used to measure the temperature leakage from a standard compost bin and the cosy compost prototype. Note a fan heater was used to simulate the compost heat output in the prototype.

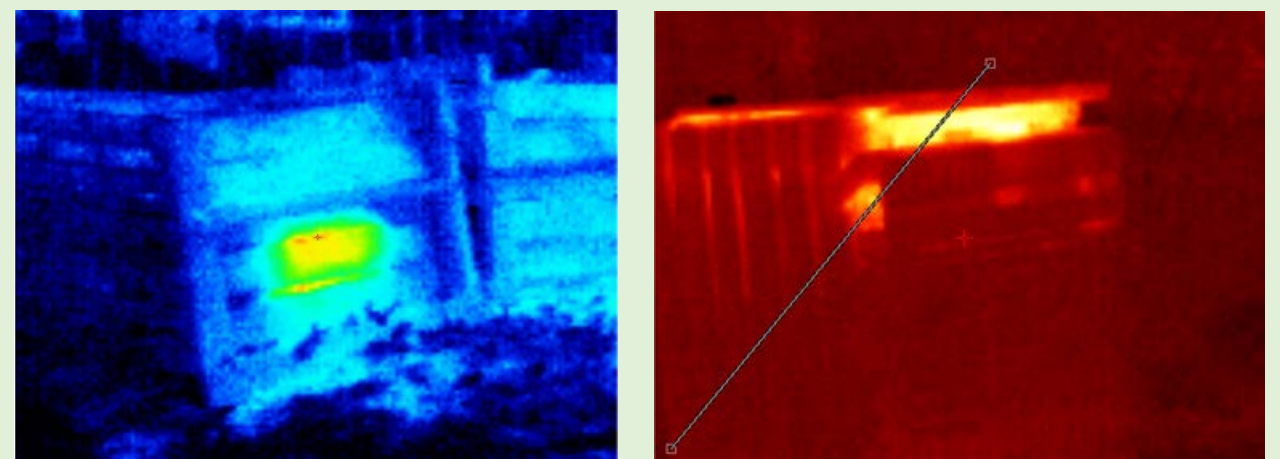


Figure 4: Infra-Red Picture of a normal compost bin (Left) vs the Cosy Compost prototype (right)

DESIGN

The Cosy Compost bin (Figure 5) is made of wooden pallets. The cubic shape is in concordance with the other compost bins available on most of the allotments, and measures approximately 1 m³. The insulation is made of 15 layers of cardboard slid inside the pallets.

The front pallet is divided into 3 sections for an easy access and the lid is composed of a single layer of wooden slats attached together for a safe handling.



Figure 5: Cosy Compost Prototype

DELIVERY

After presenting the prototype video and leaflet to IEB, it was discovered that a policy enforced at IEB allotments forbids any use of plastic. The prototype could therefore not be accepted, leading to the use of only corrugated cardboard as insulation material. The revised prototype was delivered to Speedwell allotments. It will be used (and tested) during the winter. It can be used by any of the community members on this site but its use will be monitored by IEB.

The video and the leaflet are available online and from IEB. They explain step by step the process of building an insulated compost bin and give a short introduction on the theory of composting and why insulation is necessary. Figure 6 shows the final delivery of the prototype to Speedwell Allotment. IEB accepted the deliverables and look forward to implementing them.



Figure 6: Delivery of the prototype to Speedwell Allotment

KEY LEARNINGS

- As a team, we should have regularly confirmed the clients expectations of the output to avoid the initial brief changing after our outputs had been delivered. This would have avoided a misalignment of expected outcome.
- Organising physical meetings with groups in different areas can be difficult, but we have learnt the value of face to face meetings over easier forms of communication such as emails, in which information can be misinterpreted.
- Engagement with the community via the questionnaire was an extremely useful method of understanding the market we were delivering to, and is a method we would be likely to use in the future.

[1] IEB, <http://ediblebristol.org.uk/>

[2] Compost Physics, <http://compost.css.cornell.edu/physics.html>

[3] Hotbin, <https://www.allotment-garden.org/product-reviews/hotbin-hot-compost-bin-review/>