A waste mapping model in a UK ready-to-reheat (RTR) food manufacturing site: implications for waste reduction and process efficiency

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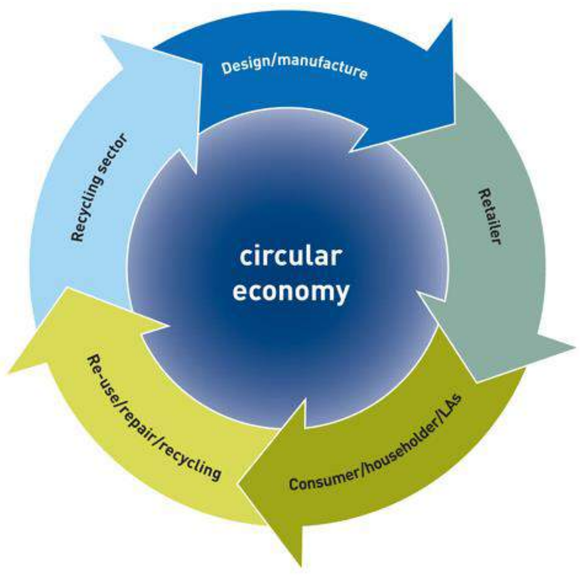
Introduction

In UK food-businesses, the true cost of waste can be up to 4% of turnover (WRAP, 2019a). However, resource efficiency initiatives have shown that by implementing 'materials-reduction-measures' as part of a wider resource efficiency programme, overall waste can be reduced by 25% (WRAP, 2013). This is critical in food businesses where margins can be low, manufacturing processes complex and processes inefficient, which all may contribute to food-waste production.

Waste mapping can assist a food-business control processes, drive efficiency measures and reduce waste (food/non-food), forming the framework of a circular economy model (see Figure 1) (WRAP, 2019b).

Figure 1. A Circular Economy *(Source: WRAP, 2019b)*



Purpose

The purpose of this research is to investigate and highlight the points of food-waste generation in a ready-to-reheat (RTR) chilled food business.

Methods

- In-depth observational audits from goods-in, through the process, at point-of-packing, to despatch and the waste yard were undertaken in a RTR food-manufacturing business, resulting in >210 data-capture-points.
- Fourteen waste control points (WCPs) associated with food-waste generation were identified.
- Interventions for recording and data analysis were implemented and waste was tracked over a specified time period.

References

- Huss, HH and Ryder, J. (2003) '7 Prerequisites to HACCP'. *In* Assessment and Management of Seafood Safety and Quality. FAO Fisheries Technical Paper 444. Food and Agriculture Organisation of the United Nations. Rome.
- Waste and Resources Action Programme (WRAP) (2013) Waste Mapping: Your Route to More Profit: Business Resource Efficiency Guide. Internet source: http://www.wrap.org.uk/sites/files/wrap/WRAP_Waste_Mapping_Guide.pdf [Accessed 27/06/19]
- Waste and Resources Action Programme (WRAP) (2019a) Food waste measurement. Internet source: http://www.wrap.org.uk/category/priority-areas/food-and-drink/business-food-waste/food-waste-measurement [Accessed 13/03/19]
- Waste and Resources Action Programme (WRAP) (2019b) WRAP and the circular economy. Internet source: http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy [Accessed 25/06/19]

Results

Observational-audits facilitated generation of a company-specific waste mapping template (for example see Figure 2) based on a review and analysis of the factory layout (Figure 3). The waste mapping template included measurable critical waste points with waste-reduction potential. Overall, data capture focused on four WCPs in the high-care food production area (although measurements were analysed across all WCPs) (see Table 1 for identified four WCPs).

Table 1. WCPs for data collection.

HIGH CARE PRODUCTION
Meat production (WCP 7)
Decant (Kitchen/Chiller) (WCP 8)
Line Waste (7 lines) (WCP 9)
Technical (WCP 10)

Figure 2. Waste mapping template for generation of waste control points in food manufacturing.

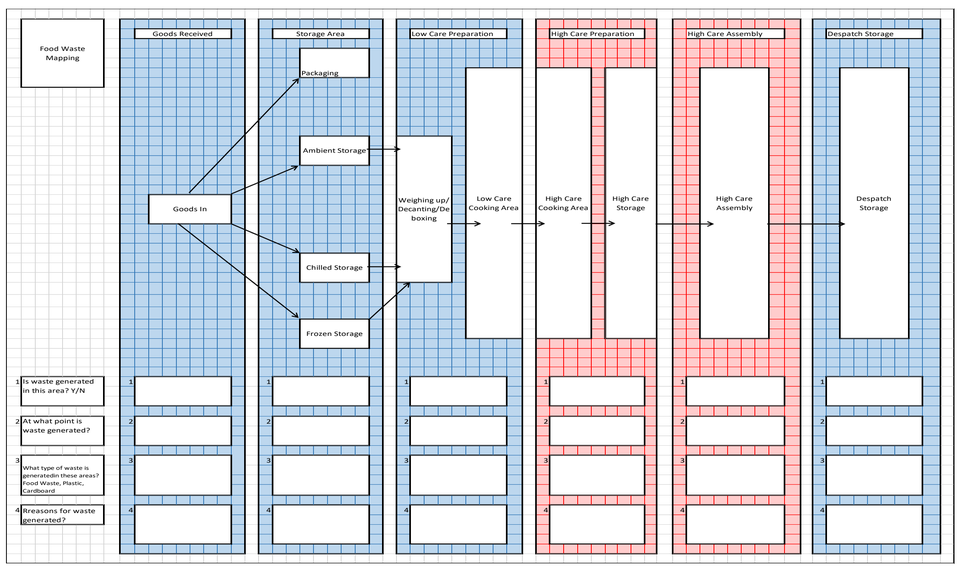
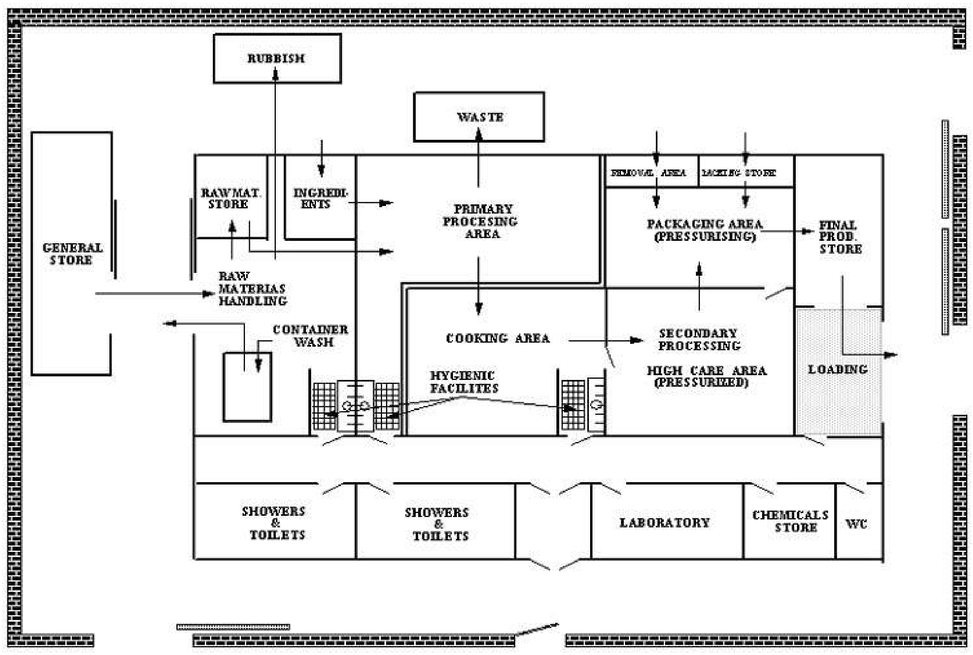


Figure 3. An example of a high care factory layout *(Source: Huss and Ryder, 2003).*



During a two month period it was observed at one WCP the amount of food waste generated was 3,000kg with a monetary value of £2,500. This was attributed to planning and demand anomalies

At another WCP, over the same period, floor waste e.g. food dropped on floor/spillages, equated to 2,700kg, all of which was unusable.

As a result of waste mapping determination, the manufacturer improved waste recording from 20% to 60% of total recorded waste, with month-on-month improvements.

Figure 4. Images of high-care waste observations.

Waste mapping in a food business is specific to an organisations manufacturing site, products and processes. It can be invaluable tool to establish food waste in a process and highlighting processing inefficiencies, and subsequent improvements in production efficiencies and monetary gain.

Figure 4 highlights when waste segregation is not managed effectively it can lead to implications for higher cost in waste disposal.

Conclusion

Waste-mapping is invaluable in driving process efficiency, process control, improving business and environment sustainability, reducing waste, and consequently improving business profitability.

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