

Success Story

Opportunity for Cobotics

Hames Chocolate, UK



- Made in Britain
- Sustainable Cocoa
- British Milk

Opportunity for Cobotics

Company description

Hames Chocolates began as a family venture and has been manufacturing chocolates in Lincolnshire for over fifteen years. The customer base is across the leisure and retail sectors, including high footfall tourism attractions, leisure centres, holiday parks, as well as specialist chocolate shops, chocolate makers, garden centres and department stores. They manufacture bespoke personalised chocolates and confectionery for both own label and promotional sectors, and work with many food service suppliers. The operations on site include manufacturing, wrapping, packing, bespoke graphics design, product development and sales.

A very wide range of products are produced including truffles, filled chocolates, chocolate bars, chocolate Neapolitans, private label chocolates, bespoke chocolates, moulded chocolates, hollow chocolate figures, enrobed products, and chocolate assortment boxes. Seasonal products such as chocolate Easter eggs and advent calendars are also made on site. There is mix of automated, semi-automated and manual processes used depending on the products and size of production run required.

They claim “we are possibly one of the biggest British chocolate companies you have never heard of”.

Sales have grown strongly in the last 12 months as UK businesses look increasingly to source products from home-grown producers rather than imports.

Goal

The aim of this COTEMACO support is to assess the current production at Hames and provide automation advice and support to underpin future business growth.

Motivation/Starting Point

NOTE: Hames’ customer identities and the products produced for those customers are subject to strict confidentiality clauses and this limits the detail that can be included in this report.

Recently, sales growth has been very strong with a 68% increase from 2020 to 2021, as customers seek to source more UK manufactured products. In addition to this growth, and as with many food businesses Hames are experiencing challenges with finding sufficient staff to support production. This is seen to be an ongoing issue and flexible automation/cobotic technologies are being investigated as part of a strategic plan for more sustainable and competitive production in future years.

The very wide range of products produced necessitate many different process flows through the factory. Current production is a mix of automated, semi-automated and manual operations depending on the product line and stage of production. A very generic sequence of operations is;

1. Prepare chocolate and add flavourings if required
2. Deposit chocolate into moulds
3. Chilling to set chocolate
4. Demoulding of chocolates
5. Possible decoration and further chilling
6. Possible packing to recessed insert tray
7. Packing operations comprising of; chocolate contact wrapping, metal detection, consumer boxing, consumer box wrapping, but not in same order for all products.
8. Outer distribution cartoning
9. Palletising
10. Dispatch

For most of these operations, different pieces of equipment or manual operations can be used dependent on the particular products, and there are multiples of equipment (with small differences) for common tasks across different products.

SME Support Activities

An initial assessment of the production operations was carried out to identify bottlenecks, effort intensive operations, process flow issues, and where automation could provide business benefit.

Process flow

The sequential equipment to produce many products was distributed around the factory as function of the evolution of the business, extensions of the building, and the space available when the equipment was installed. This has led to somewhat contorted flows for some products (Figure 1). For example, currently Neapolitans and bars are produced in the Chocolate Room, moved through Room 4 to Room 1 or Room 2 for wrapping, and can subsequently be boxed in Room 1, 3 or 4.

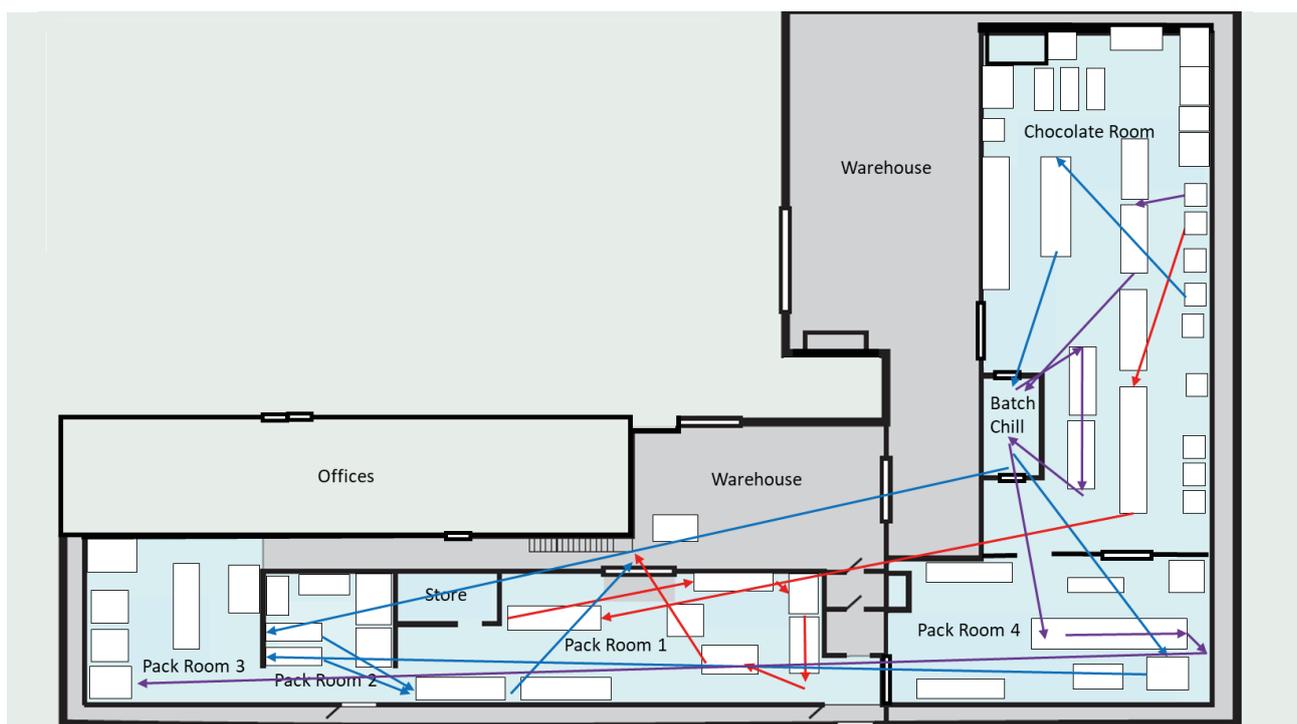


Figure 1. Some example process flows for 3 example products

This segmented flow arrangement also necessitated process buffers of stacked trays of product before and after each machine/process. This used a substantial amount of floorspace and hindered free flow of movements around the factory.

Improving flow in the factory space would be beneficial before introduction of any further automation and/or cobotics. The suggested approach would be to group equipment in rooms broadly in the order of use in the generic flow – forming, contact wrapping, boxing so that products would flow from forming through wrapping and boxing towards the warehouse (Figure 2). This would be a generic flow from production in the Chocolate Room through predominantly wrapping/bagging in Room 4, to predominantly boxing in Rooms 1-3. Moving wrapping machinery to Room 4 would create space in Room 1 for the multipurpose conveyor/table currently in Room 4. Additionally, moving the equipment used for producing the higher sales volume products to be adjacent, where chocolate would move directly from one machine to the next, would eliminate the need for buffer stacks of product. However, this would require inline chilling as an alternative to the current manually loaded batch chilling used for most products.

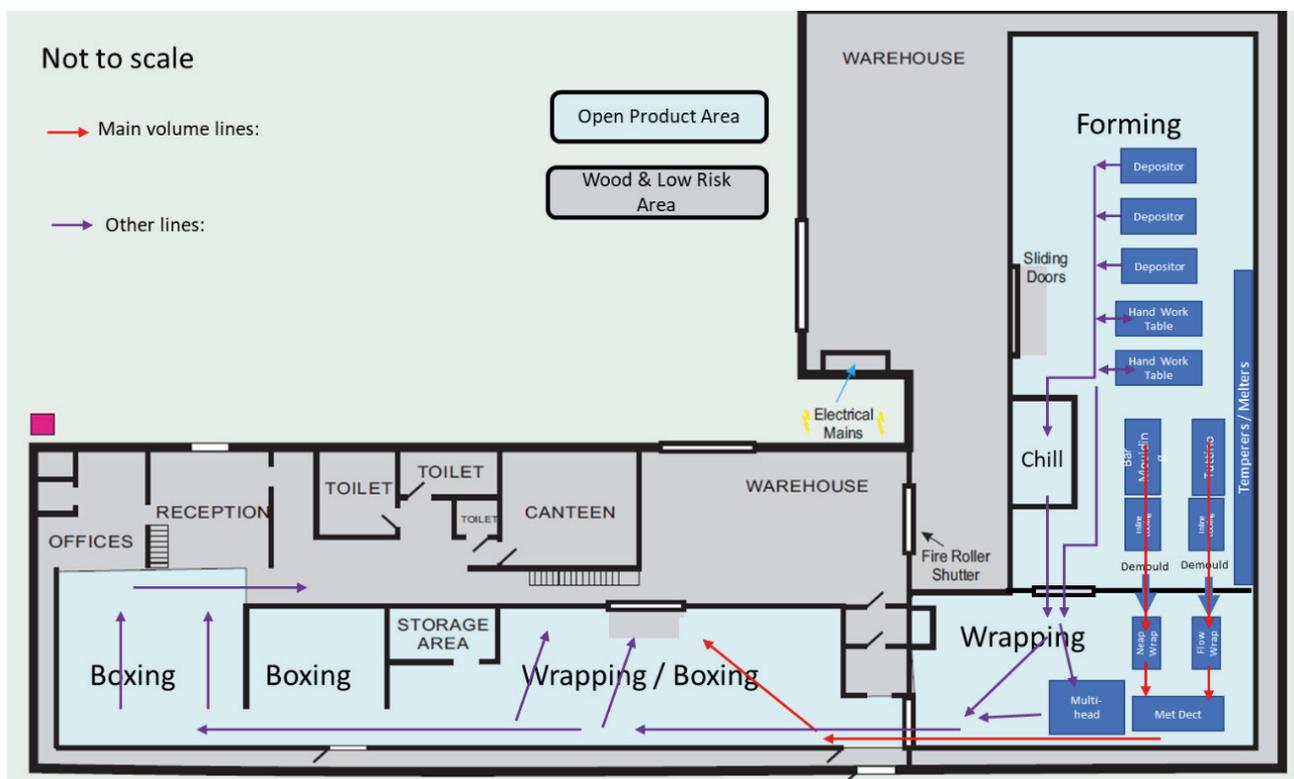


Figure 2. Suggested revised layout for smoother flow

Handling cobotics

A major effort intensive task at Hames is in box folding, both outer cartons and more especially the consumer packaging boxes. Whilst the magnitude of staff effort put into these tasks would suggest box folding as a target for automation, the wide variety of different shapes and sizes, and often the complexity of folding required would not make it an ideal topic for a first foray into automation for Hames.

Several other tedious and repetitive common tasks were identified on a first pass as potential automation targets. If automation could be implemented, this would allow staff to move to more stimulating and/or dextrous tasks such as boxing. Initial assessment of possible tasks for cobotics are:

- a) mould placement from trays onto depositor machine infeed belts
- b) mould removal from machine outfeed into trays

- c) placing of trays of moulded chocolate into racks for manual wheeling to batch chill room
- d) demoulding of chilled chocolate into trays or onto belts
- e) placement of chocolate items into flow wrappers
- f) possibly some placements of wrapped chocolate into consumer packaging
- g) carton loading of consumer packaged/boxed products

Despite the need for more detailed feasibility assessments, possible tasks a, b, c, and g, are reasonably well structured with relatively low degrees of variation and are expected to pose fewer cobotic deployment issues. Tasks d, e, and f are slightly more complex, and would need slightly more bespoke development activities.

Because there are multiple machines capable of similar tasks (but for different products) these handling tasks could be best addressed by cobotic arms on wheels that could be re-located around the factory to service different machines as and when required (e.g. Figure 3).



Figure 3. Example of re-locatable cobots

Using locator spigots at each deployment location to ensure repeatability of positioning would allow a preprogrammed task to be selected corresponding to that location/product/machine. The basic cobot trolley units are available as off the shelf products primarily targeted at engineering manufacturing so some additional measures may be required for operation in a food environment.

Given this potential, a demonstration of cobotic technology was arranged at Hames to introduce an external automation systems provider. This passed off well and further more detail feasibility works are in progress.

Implementation

Since the first COTEMACO visit a new cooling tunnel has been installed in the chocolate room and plans are underway to realign several depositing machines to feed directly

into the cooling tunnel. This will remove need for some process buffer stacks, remove the need for manual trolleying of product to/from the batch cooling room, reduce potential bottlenecks at the batch cooling room, and give an overall improvement to products flow in the chocolate room.

After the success of the initial cobotic demonstration, more detailed follow-up visits will be made to identify the most suitable operation(s) for a first cobotic handling system, and progress towards adoption. The success of this will be reviewed and further steps considered as time progresses and the enterprise grows. Business growth will be both the driver and financial enabler for adoption of further cobotic technologies.

Impact on the Business

The key benefits of automation for Hames will be in improved production capacity. This will allow them to move staff from some of the tedious handling tasks to more rewarding (and value adding) ones.

The business commented that they whole-heartedly believe that automation is the ideal solution for them and will allow them to optimise their output and continue to grow. The COTEMACO support scheme has been a key starting point for them to understand the automation technologies involved and begin this onwards journey.

Interview

How could COTEMACO support you?

Via the SME support programme, COTEMACO engages with SMEs from the automotive and food sectors through field labs. These regional field labs in the UK, the Netherlands, Belgium and Germany are showcasing key production steps in the automotive and food industries, in order to tackle current low sectorial awareness and knowledge gaps. The field labs will exchange knowledge on different manufacturing tasks, such as handling and (un)loading.

With the COTEMACO programme, manufacturing SMEs are guided through the process of adopting collaborative robotic and shop floor digitalisation technologies, from the exploration of technological opportunities to the detailed definition of a business plan.



What is COTEMACO?

The project, which is an initiative of Interreg North-West Europe, aims to support around 60 SMEs in the automotive and food manufacturing industries with so-called „test environments“ and to encourage them to integrate collaborative robotic systems and digital technologies into their business. Accordingly, in addition to increasing production flexibility, the relocation of production abroad will be curbed and the number of jobs in manufacturing increased, which will generally lead to an improvement in the competitiveness of the companies involved.

In the project new technologies are implemented in application examples - the aim is to move from the prototype in the laboratory environment to the transfer to production, taking into account the legal situation and certifications.

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