15.8.3.3 Less chocolate is required than for a shell moulding plant

Little or no chocolate is scraped off the moulds in cold forming system compared with the 50%, or even more, which is tipped out of the mould during traditional processing and then requires reheating and re-tempering. Cold forming thus requires smaller temperers and storage tanks and changeovers between chocolates require less cleaning.

15.8.3.4 Very low fat chocolates can be processed

The forming process is largely independent of the chocolate viscosity. This has enabled "chocolates" with fat contents as low as 22% fat to be made into shells (Aasted, 1997).

15.8.3.5 Reduced plant size

The process no longer requires a section for mould inversion and chocolate draining thus reducing the plant size to something similar to a moulding plant. It may also be possible to reduce the length of the cooling tunnel to reflect the heat removed during the forming process.

15.8.3.6 Multi-product moulding

With conventional shell-making it is difficult to form differently-shaped shells in a single mould efficiently and the need to recycle some 50% of the chocolate constrains the process to a single chocolate at each depositing stage. These constraints are removed in cold forming technology and it is therefore possible to produce a complete assortment with multiple chocolate types at a single depositor (Figure 15.22) dramatically simplifying robotic packing operations.

Figure 15.22 Complete assortment produced with a single deposit (Aasted, Denmark).

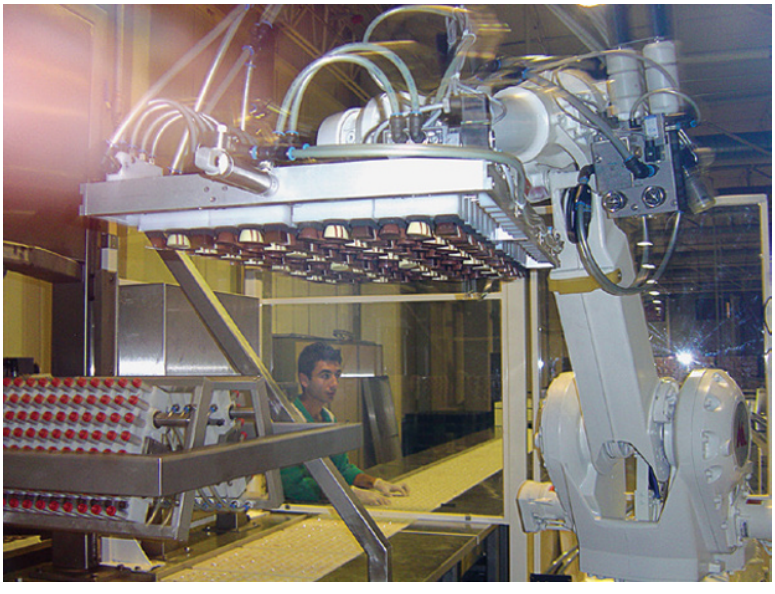

Figure 15.23 Robot loading complete boxes using the ChocoAssort™ system (Aasted, Denmark).

Aasted-Mikroverk has developed this concept in their ChocoAssort™ process (see Figure 15.23).

15.8.4 Disadvantages of cold forming

15.8.4.1 The need for air conditioning in the processing zone

As was noted earlier the cone or plunger must be used under relatively low humidity conditions.

15.8.4.2 The requirement for very precise mould manufacture and positioning

If the cone is not in the centre of the mould, then one side of the product will be thin and the opposite one thicker. This means that both the mould itself and the positioning mechanism must be very accurate. Kniel (1997) showed that, at Chocolate Frey, the maximum tolerance for a 1000 mm (3.3 ft) wide production line was only ±0.3 mm (0.01 in). Depending on the shape of the product to be made and the size and format of the mould, the minimum shell thickness may be in the range 1.5–2 mm (0.05–0.07 in). To achieve this accurate alignment of the plunger tool to the moulds, care must be taken to adjust the plunger tool.

15.8.4.3 Cost of plungers and moulds

Moulds and formers are much more expensive than conventional moulds because of the greater precision required by the process.