

# THE QUALITY AND ECONOMIC IMPACT OF WEIGHT ACCURACY

**A healthy profit margin is not easy to achieve without sound process control systems and use of technology. In this article, Yusuf Patanwala explores weight accuracy and its importance for a successful bakery business, by looking at scenarios where there is weight variation.**

**P**rofit Margins in a bakery is highly influenced by how effectively it is able to manage its costs of manufacturing and distribution. The costs of raw materials and ingredients comprise a total of 50 per cent or more of the total costs and hence any savings here has a direct impact on the profit margin.

A healthy profit margin helps a bakery to invest in infrastructure, technology and skilled manpower, which in turn yields better growth and expansion opportunities.

A healthy profit margin, however, is not easy to achieve without sound process control systems and use of technology. WEIGHT ACCURACY is one aspect in the bakery which can directly improve the bottom line with use of the above: process control and technology.

Let us try to explore Weight Accuracy in more detail in this article. The best way to realise the importance of “weight accuracy” is by looking at scenarios where there is “weight variation”.

## 1. Outer Appearance

The most visible impact of weight variation is seen in the final product. We will notice final products that are uneven in shape and size. The more the difference in weight, the more the variation. Product uniformity is one of the important criteria for quality, and weight variation is its enemy.

## 2. Inner Texture

One of the reasons for highly open or dense texture of bakery products (that are baked in tins with lids) is due to weight variation. The volume of the tin is fixed for a certain weight but when there is weight variation, the final product texture will be either more dense or open. This affects the taste and mouthfeel of the product and ultimately leads to lower perception of quality.



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## 3. Uneven Baking

Uneven Baking is the direct result of above point number 2. The final product will have colour variation and again negatively impact the product quality in the eyes of the customer.

## 4. Compliance issues with Law

We cannot sell goods that weigh less than what is mentioned on the packet. Weight variation compels us to bake products with a “buffer weight”. This means extra material, resulting in loss of revenue!

## 5. Issues during Packaging

When products are baked in tins with open top, there is always a difference in height of these products due to weight variation. This leads to product breakage / damage issues during packing and also higher than normal product rejections.

## 6. High Rejection

When bakeries are producing for other brands or companies, the level of rejections is very high due to non-compliance and stringer norms.

## 7. Drop in Plant Efficiency

The above factors lead to an overall drop in Plant Efficiency. The operators at every level are required to check the weight of products at various stages, record them, reject them, reuse or recycle them, etc. This leads to waste of manpower time, equipment utilisation and manpower morale.

Once we are truly convinced on the above issues and determined to eliminate the problem of weight variation, we can start taking the right steps in the right direction. Process Improvement and Use of Technology both go

hand in hand and we need to ensure we balance both the aspects.

Lets discuss the Process Improvement aspect and then take up the Technology aspect

### Process Improvement:

**First Step** - we need to identify which steps in the manufacturing process involve scaling of ingredients or dough. Few of these steps could be:

1. Scaling of dry and wet ingredients at the time of batch making / mixing
2. Scaling of cake batter or dough at the time of depositing in moulds or dividing
3. Layering and top decoration on cakes or injecting
4. Sprinkling of various garnishes on the finished product

**Second Step** - we need to collect and record the data at each of the above stages. We can plot the readings on the graph and also make use of the concept of Standard Deviation (as explained in the image).

**Third Step** - we need to analyse the data. Data analysis will help us identify the real cause of weight variation. The probable causes could be the following:

1. **Errors due to Machinery:** Malfunctioning of load cells, sensors, piston, etc., that lead to weight variation. Improper settings, air or dough leakage due to wear and tear.
2. **Errors due to Material:** Inconsistent quality of input / supply of ingredients and raw material. For eg. change in flour properties from batch to batch affects other processes down the line.
3. **Errors due to Manpower:** Negligence, not following set procedures, lack of proper training and motivation, ignorance of the importance of process discipline, etc.
4. **Errors due to Methods:** Too short or too long waiting time between batches affects dough properties and ultimately affects quality of output from machines.

**Fourth Step** - we need to evaluate the impact that each of the above factors has on weight variation and take measures to rectify them.

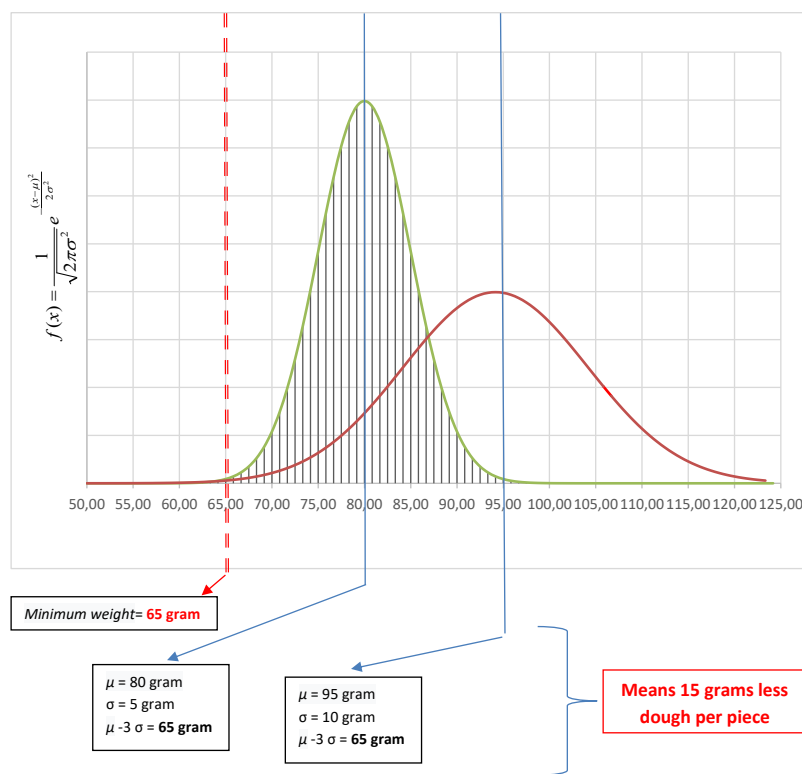
Finally - we need to set procedures in place to maintain the level thus achieved.

### Use of Technology

The above steps in process improvement will help us understand what is working or what is not working and the magnitude of it - how good or how bad. Based on this data, we can determine which areas of the process can be

### ECONOMIC IMPORTANCE OF WEIGHT ACCURACY

Probability density function



corrected by use of technology.

Some of the examples could be the following:

1. As mentioned in point 4 of the third step above, properties of dough change with time for certain products or when mixed in specific ways. The understanding of this aspect helps us to design our processes that take care of this fact and help eliminate variations in dough properties.

2. There are certain limitations in some equipment and machinery while handling variety of dough. We need to identify those limitations - what works and what doesn't work well on our machines. When our production volumes are high, we cannot risk working with machines that do not deliver the results.

3. Many well-known companies produce weighing scales that have high levels of accuracy - it makes sense to use them while weighing critical ingredients.

4. Similarly, machines with high levels of precision in scaling dough can help save substantial amount of wastage.

One challenge with high precision machines is their high initial investments but simple mathematical calculations based on the above data can help us determine the return on investments (ROI) on such machinery. ROI of less than 3 years is a very good investment, and we must do it! ❀