

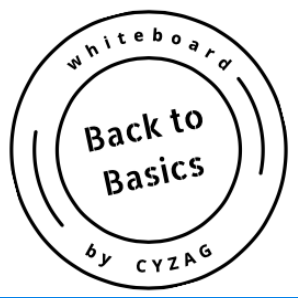


whiteboard
by CYZAG



**Lacking process
stability costs money**

**Let's get back to basics
of Process Variations**



The need

Do you want to improve your manufacturing performance and increase your bottom line?

A smart way is to get process stability. To get there, track process variations and differentiate common from special cause variation, acting only when needed.

Let's get back to basics and focus on Process Variations & Control charts.



1. Why do Process Variations matter?

Process performance measurements, like raw material and energy consumptions or product quality, are usually made using averages.

The average may seem logical, but variation is more valuable, especially for the people operating plants.

By identifying and limiting factors that cause outlier results, you can improve averages by default.



2. What are Process Variations?

Process variation in the chemical industry refers to the variability that occurs in the production of chemicals.

Variability can occur at any stage of the production process, from raw materials and equipment to the skills and techniques of the workers.

Process variations are divided into two types: common cause and special cause.



2. What are Process Variations?

Common cause variation

It is the system's inherent variability due to many small causes that are always present.

Fluctuations, for example, in energy consumption, might occur due to the outside temperature, humidity, and energy grid fluctuations.

This variation can be changed only by improving the equipment or changing work procedures; the operator has little influence over it.



2. What are Process Variations?

Special cause variation

It refers to any factor affecting the process and resulting in variation that happens under nonstandard operating conditions.

Disparities could, for example, occur in energy consumption if the product density is higher or process temperature is raised, requiring extra pumping energy.

This variation can occur because of operator error, equipment malfunction, raw material problems, or any other abnormal disruptive inputs.



3. Identify Process Variation with Control Charts.

The control chart is a graph used to study how a process changes over time and helps identify common and special causes of variation.

Data are plotted in time order, and the chart always has the following elements:

- A central line for the average,
- An upper line for the upper control limit (3 standard deviations above the average), and
- A lower line for the lower control limit (3 standard deviations below the average)



3. Identify Process Variation with Control Charts.



Comparing current data to these limits, it can be concluded if the process variation is in control (only common causes identified) or out of control (affected by special causes of variation).

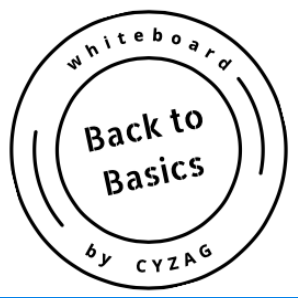


4. Why is it important to separate a common from special cause?

Because treating them as the same leads to inefficient changes and waste.

If the control chart shows common cause variation -> continue monitoring but do not change the process. The variation is part of the process.

If the control chart shows a special cause variation -> respond to it by investigating and identifying the root cause of variation and implementing actions to reduce or eliminate it.

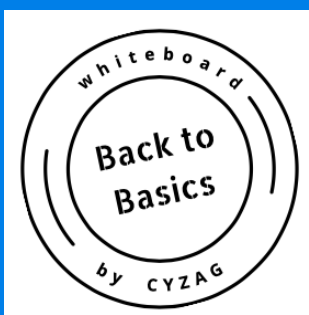


4. Why is it important to separate a common from special cause?

Note that keeping a process in control doesn't mean necessarily that the process or product is acceptable; the system must also be capable of making acceptable products.

Control and capability are different concepts.

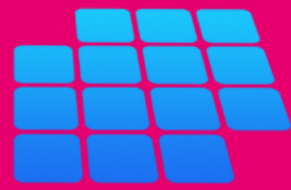
Capability will be discussed in our next "Back to basics".



At Cyzag, we understand the importance of Statistical Process Control (SPC), which includes control charts and variations.

That's why we developed the SPC module. It allows you to build control charts easily and set thresholds, helping production staff to take action only when needed, at the right time, based on data.

It is also a powerful tool for process improvements.



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Do you need help to move decision-making to the source, saving you time and money?

Book a demo with us today to understand how.