FDE 418
FOOD QUALITY CONTROL
LESSON-8

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Six sigma quality approach

- ✓ In 1980's, Motorola coined "six-sigma" to describe their higher quality efforts
- ✓ A benchmark in many industries
- ✓ A methodology used to deal with process variability, to measure and improve company's performance, practices and systems

Six sigma approach

- ✓ To optimize and stabilize process parameters in order to reduce defects and quality issues (Improve efficiency, reduce unnecessary cost of poor quality)
- ✓ The general methodology is called DMAIC (define, measure, analyze, improve, control)
- ✓ A lot of statistics is involved in understanding hypothesis of situations
- ✓ It is widely used in many top corporations around the world

Six sigma approach

- ✓ Six Sigma is not a standard or a certification
- ✓ It is a Quality Philosophy and the way of improving performance by knowing where you are and where you could be
- ✓ The term Six Sigma indicates a level of quality in which the number of defects is ***no more than 3.4 parts per million***

SIGMA LEVELS

Sigma Level (Process Capability)	Defects per Million Opportunities
2	308,537
3	66,807
4	6,210
5	233
6	3.4

SIX SIGMA METHODOLOGY
(*'It takes money to save money'*)

- ✓ The methodology is data based, all projects have to be run from a data perspective and projects have to be managed by facts
- ✓ BPMS: Business Process Management System
- ✓ DMAIC (define, measure, analyze, improve, control): Six Sigma Improvement Methodology
- ✓ DMADV: Creating new process which will perform at Six Sigma
  - ➢ Define the project
  - ➢ Measure the opportunity
  - ➢ Analyze the process options
  - ➢ Design the process
  - ➢ Verify the performance

DMAIC in Turkish:
"TÖAİK":
- ❖ **tanımla,**
- ❖ **ölç,**
- ❖ **analiz et,**
- ❖ **iyileştir**
- ❖ **kontrol et**

DMAIC is a basic component of the Six Sigma methodology

❖ ***DMAIC is the heart of Six Sigma***

- ✓ ***Define*** process goals in terms of key critical parameters (i.e. critical to quality or critical to production) on the basis of customer requirements or Voice of Customer (VOC)
- ✓ ***Measure*** the current process performance in context of goals
- ✓ ***Analyze*** the current scenario in terms of causes of variations and defects
- ✓ ***Improve*** the process by systematically reducing variation and eliminating defects
- ✓ ***Control*** future performance of the process

Six sigma approach in the food industry

- ✓ The philosophy of Six Sigma is to characterize and reduce variation within a business process

- ✓ Distribution of ***safe, high-quality products*** at an ***overall low cost*** is obviously in the interest of any business

  - ✓ This makes the Six Sigma approach ultimately appropriate for use within the food industry

Lean six sigma

- ✓ An improvement methodology and not restricted to a specific type of industries
- ✓ The goals, briefly, are to reduce the wastes and the variability of products
  - ✓ A trained team is very essential issue to eliminate the wastes, utilizing the resources and increasing the quality of products/services

Key principles of lean

- ✓ ***Quality the first time***, search for zero defects, detection and solution of problems at their source.
- ✓ ***Minimization of waste***, elimination of all activities that do not add value, optimization of the use of scarce resources (capital, people and space).
- ✓ ***Continuous improvement***, permanently evaluating the protocols thinking about what can be improved.
- ✓ ***Forward processes***, products are pulled (in the sense of requested) by the end customer, not pushed by the buyer of the raw materials.

Dominguez et al. 2022. Lean 6S in Food Production: HACCP as a Benchmark for the sixth S "Safety".

Key principles of lean

- ✓ ***Flexibility***, quickly produce different mixes of a wide variety of products, without sacrificing efficiency due to lower production volumes.
- ✓ Building and maintaining a ***long-term relationship*** with suppliers by signing agreements to share risk, costs and information.

Lean tools

continuous processes of analysis
(kaizen)

forward production
(in the sense of the Japanese term kanban)

fail-safe elements and processes
(poka yoke)

the philosophy of "doing things right"
(monozukuri)

all from the value area
(genba)

Dominguez et al. 2022. Lean 6S in Food Production: HACCP as a Benchmark for the sixth S "Safety".

Key principles of Lean 6S for the food industry

- ✓ The HACCP work philosophy-- very similar to the current work philosophy of lean 6S.
- ✓ Lean 6S is much broader
  - ✓ because it aims at global quality and not just product safety.
- ✓ It is not mandatory.
- ✓ A lean 6S in the food industry-- safety of the product at the first level

Dominguez et al. 2022. Lean 6S in Food Production: HACCP as a Benchmark for the sixth S "Safety".

Key principles of Lean 6S for the food industry

- ✓ Directly linked to the ***safety*** of the food product is cleaning (***seiso***)
  - ✓ But, it does not make sense to clean useless items.
- ✓ The ***classification*** (***seiri***) with the aim of disposing of useless items would be the second level.
- ✓ ***Cleaning*** is next since any item to be stored for possible late use must be clean.
- ✓ After these considerations the ***order*** of the S would change.

Dominguez et al. 2022. Lean 6S in Food Production: HACCP as a Benchmark for the sixth S "Safety".