THE USE OF TRADITIONAL MANAGEMENT TOOLS IN APPROACH OF THE FOOD WASTE PROBLEMS IN FOOD INDUSTRY

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Abstract: *Food is lost or wasted throughout the supply chain, from initial agricultural production down to final household consumption. Implementation of traditional management tools should take place in everyday practice of the food industry. This is in accordance with policy of the quality management, whose goal is orientation on costumers. With combination of various techniques, managers could affect some of the major problems in the food industry, including food waste and the technical malfunctions of the final products. In this paper we are suggesting the use of check sheet, histogram and cause and effect chart in analysis of causes of the return goods from the market. It should provide a better approach to the solution of the problem and also the participation of all the employees. The final result will be more efficient production, reduction of costs and less food waste.*
Key words*: traditional management tools, food waste, return goods, food industry*

INTRODUCTION

There is a connection in the food industry between products which are return from the market and the food waste, especially when the 'best-before-dates' of food are expired. In accordance with the regulations, most of these foods are forbidden for human consumption.

The issue of food losses is of high importance in the efforts to combat hunger, raise income and improve food security in the world's poorest countries. Food losses have an impact on food security for people, on food quality and safety, on economic development and on the environment. Roughly one-third of the edible parts of food produced for human consumption, gets lost or wasted globally, which is about 1.3 billion ton per year (Gustavsson et al, 2011).

Food is lost or wasted throughout the supply chain, from initial agricultural production down to final household consumption (Gustavsson et al, 2011). Manufacturing food waste was estimated at almost 35 Mt per year in the EU27 (27 Country in Europe, non including Serbia) (70kg per capita), although a lack of clarity over the definition of food waste (particularly as distinct from by-products) among member state makes this estimate fragile (Bio Intelligence Service, 2010). Food can be wasted due to quality standards, which reject food items not perfect in shape or appearance (Gustavsson et al, 2011). Technical malfunctions also play a role, including overproduction, inconsistency of manufacturing processes leading to misshapen products or product damage, packaging problems

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leading to food spoilage, and irregular sized products trimmed to fit or discarded entirely(Bio Intelligence Service, 2010).

Food quality management consists of quality strategy and policy, quality design, quality control, quality improvement and quality assurance. These activities are performed to produce and maintain a product with desired quality level against minimal costs (Luning et a.l ,2002). Quality assurance is of major importance in the food sector. Food manufacturers have to decide which quality assurance system is most suitable to their specific situation and how this system should be implemented. This can result in a higher production quality, compliance with expectations of consumers, maintenance and building trust of consumers in food production quality, and maintenance and improvement of competitiveness of food manufactures (Van der Spiegel, 2003). Luning et a.l (2002) proposed the techno-managerial approach for food quality management as a way to analyse and solve the complex quality issues. Ahmed and Hassan (2003) argued that quality management cannot be ensured without the application of the appropriate tools and techniques, and firms with greater implementation of the tools and techniques can improve their business results.

Continuous quality improvement process assumes, and even demands that team of experts in field as well as company leadership actively use quality tools in their improvement activities and decision making process. Quality tools can be used in all phases of production process, from the beginning of product development up to product marketing and customer support. At the moment there are a significant number of quality assurance and quality management tools on disposal to quality experts and managers, so the selection of most appropriated one is not always an easy task (Paliska et al., 2007). A monitoring system is necessary to measure the achievement of targets, and the deviation from the objectives; the instrument will be more effective and accurate if it can track the individual contributors that affect directly and indirectly objectives (Romaniello et al., 2011). The relevant characteristics have to be translated to proper control measures like control of respectively time-temperature conditions, raw materials and final products. Typical measures to reduce effects of the variation and perishability of food quality are selection of raw materials, processing and preservation techniques, packaging, storage and distribution (Kilcast and Subramaniam, 2000).

By using a combination of tools and techniques it is possible to highlight complex data in a simple, visually powerful way; evaluate areas that cause the most problems; give direction for areas to be prioritized; show relationships between variables; establish causes for failure; show distribution of data; and determine whether the process is acting in a state of statistical control; and highlight the effect of special causes of variation where present (Shanin et al, 2010).

The researches of Paliska et al. (2007) have shown that the application of basic quality tools in industry and services are not so common. It is necessary to point out that quality tools are not so wide spread as expected, although they are quite simple for application and easy for interpretation. With today computer capabilities and automated data acquisition there should not be any technical obstacles for wider quality tools application.

The objective of this work is to present a simple solution, based on combination of traditional management tools, for better analysis of causes of return goods (from the market) due to quality inconsistent or others similar problems connected with manufacturer.

CONTINUAL IMPROVEMENT AND THE SEVEN TRADITIONAL TOOLS OF QUALITY

The continual improvement of the process leads to customer satisfaction, which result in an external quality improvement. The continual improvement of the process also lead to fewer defects, which results in an internal quality improvement (Dahlgaard et al., 1994). Continual improvement is an ongoing effort to improve material / products, services or processes. These efforts can seek “incremental” improvement over time or “breakthrough” improvement all at once. Among the most widely used tools for continuous improvement is a four-step quality model, the plan- do-check-act (PDCA) cycle, also known as Deming Cycle or Shewhart Cycle: Plan: Identify an opportunity and plan for change; Do: Implement the change on a small scale; Check: Use data to analyze the results of the change and determine whether it made a difference; Act: If the change was successful, implement

it on a wider scale and continuously assess your results. If the change did not work, begin the cycle again (BIR, 2011).

Figure 1 PDCA cycle (GRAM CONSULTING, 2009)

The seven traditional tools and techniques of quality (QC7) is a designation given to a fixed set of graphical techniques identified as being most helpful in troubleshooting issues related to quality (Montgomery, 2005). Those tools were developed by Kaoru Ishikawa, known as the "father of quality control circles". Seven traditional quality tools include check sheet, histogram, Pareto chart, Cause and effect chart, graphical tools, scatter plot and control chart.

Check sheets, or tally charts, are a simple device on which data is collected by putting a mark against predetermined items of measurement. The purpose for which the data is collected should always be clear. For example, check sheets can be used to track events by factors such as timeliness (in time, one day late, two days late, etc.), reasons for failure during inspection (defects like blow holes, cracks, etc.) or number of customer complaints per day (UNIDO, 2006).

Histogram graphically displays a set of frequency data in bar graphs and enables evaluators to determine problems by checking the dispersion shapes, center values, and the nature of dispersion (Li et al, 2000).

The Cause and effect chart is a qualitative tool for summarizing the results of cause-effect analysis. When a graphical representation of tools is needed, graphical tools such as bar chart and pie chart are used (Shanin et al, 2010).

APPLICATION OF QUALITY TOOLS IN FOOD INDUSTRY

With using the continual improvement philosophy and three QC7 techniques: check sheets, histogram and cause and effect chart respectively, the quality managers in food industry can systematically follow the dynamic of return merchandise from the market (products which are not sold). Besides that, they can focus on exact problems and analyse why those problems are occurring. This can be manage very simply with use of personal computer and Microsoft office package which include Microsoft excel.

The monitoring period of the return products dynamic can be adjust on one week, couple of months or one year. That depends of various factors for eg. production capacity, number of different products, available decision time etc.

The products which are return from the market because of technical malfunctions, overproduction, consumption lifetime over, retail miscalculation or any other reason, is need to be recorded in the check sheet form. After the expiration of the upon defined monitoring period, the summary from the check sheet form of the return products, classified by the type of product, could be presented on the histogram. One of the main purposes of histogram is to visually present the results of check sheets. That should secure obvious preview which of products are returned in higher rate than

others and these products are marked as critical points. With the first two steps (check sheet and histogram), is obtained the answer of question: which products are critical? Next step is to translate those critical products into the cause and effect diagram. That should provide an answer on the most important question:"why?". Every employee should take participation during creating of cause and effect diagram. The managers must talk with the sale and marketing sector and also with the costumers if it is necessary. The food technologist and the workers in manufacture sector should argue about potential problems trough brainstorming technique. The cause and effect diagram is designed in the shape of the fish bone. It's important to write the critical point in the place where should be the fish head. On the side bones is need to add every segment of company which may be responsible for problem occurrence. For instance that could be: human mistake, overproduction, system and tools, bad material, sales/marketing sector, market and costumers etc. In cause and effect diagram those are labeled as primary causes. Every other cause which effect on primary cause is labeled as sub-cause. The smaller sub-cause bones get closer and closer to root causes for the problem. If the reason of the problem occurrence is identified, furthermore it is necessary to prevent the problem appearance. This indicates the end of the cycle and in complies with the PDCA continual improvement, after implementation of the new process or procedure, the new monitoring start right away to confirm the actions taken. This is shown in figure 2.

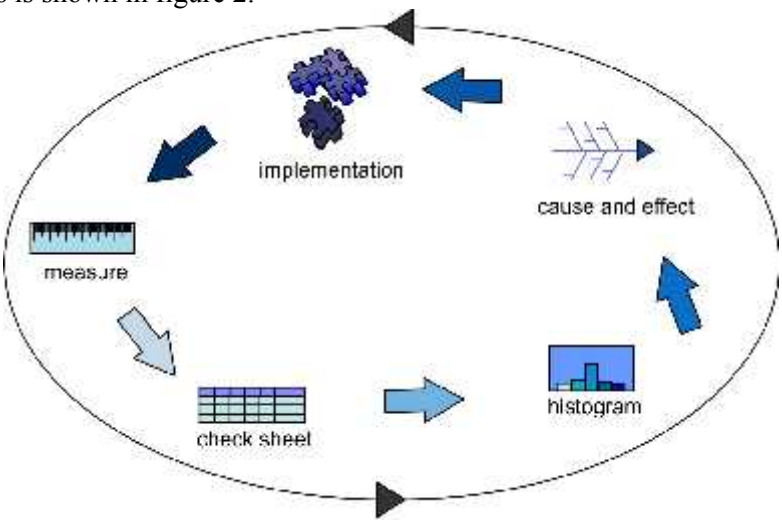

Figure 2 Application of basic manager tools in comply with continual improving philosophy

CONCLUSION

Application of manager tools in the food industry is necessary in several reasons, some of them are relatively simple implementation and the low costs. The manager could use basic quality management knowledge to overcome some expensive implementation systems, especially in medium or small enterprises. The benefits of that should be less defect products, efficacy production, satisfied customers, money savings and finally less food throwing. Specifically, the implementation of three QC7 techniques: check sheets, histogram and cause and effect chart, will not solve the food waste problems of the food industry in general and create foolproof technological process, but it will certainly provide better focus on problems and sometimes final solutions can be achieved. Also with continual improving philosophy, the results of quality progress will be obvious. The implementation of basic management tools is just one of the first steps in developing process of the food industry. The final destination is satisfied customers and the production efficiency with the minimal food waste.

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