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## USING THE QUALITY IMPROVEMENT TOOLS IN THE INNOVATION PROCESS FOR DEVELOPING AND MANUFACTURING HIGH-QUALITY PRODUCTS FOR THE AUTOMOBILE INDUSTRY

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**ABSTRACT:** The classification of tools into sections of the PDCA Cycle is not meant to be strictly applied, but it is a useful prompt to help you choose what to do at each critical stage of your improvement efforts. But, the PDCA Cycle remains a really checklist of the four stages which you must go through to get from “problem-faced” to “problem solved”. Use the PDCA Cycle to coordinate the continuous improvement efforts. It both emphasises and demonstrates that improvement programs must start with careful planning, must result in effective action, and must move on again to careful planning in a continuous cycle. The Dräxлмаier Group feels responsible for the results and optimization of processes. By consistent implementation of process management, the Dräxлмаier Process Management allows for the continuous improvement of synergies, promptness, and efficiency of our processes in the future. In this study case we present the vision, mission and objectives for developing and manufacturing high-quality products for the automobile industry.

**KEYWORDS:** quality improvement tools, PDCA Cycle, Pareto chart, automobile industry

### ❖ INTRODUCTION

On the imaginary axis Pitești - Timișoara, Hunedoara is very well positioned, at 12 Km from the European road and, as all the DRX subsidiaries which are close to rivers, Hunedoara is bordered by Cerna River and guarded by Corvin Castle.

In 2003, the first stone was put in the foundation of the construction that was going to be completed by the end of the year. In the same time, were made the first hires, intended to form the team with what Draexлмаier started off.

In early December 2003 it was built the first wiring section, the module Basis R50. In early January 2004 it is launching of the first production line for body wiring KSK R50 (KSK wiring at the customer's request).

At the beginning of 2006 it starts the new project (R56) that follows the product R50, the body wiring for the new model Mini Cooper. In March 2006 it starts the new project (R53) - the body wiring for the new model Mini Bertone.

### ❖ THE QUALITY POLICY

Corresponding with the corporate culture, the processes and results are critically scrutinized in periodic internal evaluations and measured using process indicators. The Dräxлмаier Group feels responsible for the results and optimization of processes. By consistent implementation of process management, the Dräxлмаier Process Management allows for the continuous improvement of synergies, promptness, and efficiency of our processes in the future.

The quality policy at the Dräxлмаier Group Hunedoara is summarized as follow:

- The quality policy is part of the fundamental thesis of the company, serving as a tool for coordinating and directing all the business management decisions, the purpose being the general optimization.
- Each employee feels compelled to get a top quality.
- For all the employees is valid the continuous improvement principle. It is understood that in all areas we aim for “Zero mistakes”.
- We work from the beginning, along the entire chain of processes, to achieve the quality goals established.
- As support for this, we use a comprehensive Quality Management System.
- Under a continuous and systematic consideration of the environmental and security issues, we guarantee safe working conditions, appropriate to the legal requirements and customer wishes.

The success of our company, through the development and manufacture of high value products for our demanding customers, is based on three essential pillars:

- ❖ The quality of our employees to successfully overcome the future challenges either through professional, methodological and social competence, or a very high motivation.
- ❖ The quality of our technologies and innovations, to continuously inspire our customers with innovative new solutions.
- ❖ The quality of our processes, to profitably and continuously meet the requirements of our customers through effective and popular procedures.

The employees of the Dräxlmaier Group, the customers' trust in the innovative strength and the capabilities for developing and manufacturing high-quality products for the automobile industry is constant motivation for continuous high performance. In this sense, the vision, mission and objectives are:

- ❖ The Individual mobility is our passion. The Automotive fascination is our fuel. The Innovation and quality are our goals.
- ❖ We join the various skills in strong teams. To this end, in the centre of our universe of values is the respect for people and their performances.
- ❖ Our philosophy is to seek solutions, giving a new impetus and creating the future of the cars.

We act in order to ensure the success of our company through a real added value, for the benefit of our customers, as follow:

- Employees and management:
  - ❖ *We think* in terms of market, and thus in our company's interest.
  - ❖ *We propose* ambitious goals and follow them with enthusiasm.
  - ❖ *We appreciate* the leadership style that encourages the individual capacities and cooperation which, through transparency, creates a culture of trust.
  - ❖ *We work* together openly, based on agreed targets, and we encourage the cooperation based on partnership and the personal development of the collaborators.
- Company and shareholders:
  - ❖ *We are* an autonomous and independent family company.
  - ❖ *We believe* in right and long-term partnerships with our customers, partners and suppliers.
  - ❖ *We successfully develop* the company, create jobs and work profitably.
  - ❖ *We think* in a global framework and we consider ourselves to be an international network.
- International markets and customers:
  - ❖ *We create*, on our own initiative and with passion, innovative solutions that bring clear benefits to our customers and emphasize their individuality.
  - ❖ *We seek* an active dialogue with our customers and we identify ourselves with their goals and their market positioning.
  - ❖ *We strive* for an optimum price/quality proportion, mutually advantageous.
  - ❖ *We impose* high quality standards, we are trustworthy and we turn our customers on.
- The International capital market:
  - ❖ *We invest* in future technologies, with long-term dividends.
  - ❖ *We strengthen* our individual share capital, by the required reference to the growth.
  - ❖ *We carry on*, by long-term strategies, a value-oriented organic progress and a proper capitalization of the internal and external capital used.
  - ❖ *We use* the most modern international financing instruments, and we have the necessary transparency in the reports sent to our funding partners.
- The society:
  - ❖ *We take responsibility* for the social environment, we consider ourselves a part of it, and we are committed to its welfare.
  - ❖ *We respect* values, such as: responsibility, trust and tolerance.
  - ❖ *We value* the long-term solutions which harmonize the economic objectives with the environmental issues.
  - ❖ *We introduce* procedures and methods to help protect the resources and raw materials.



Figure 1. The Quality understanding

#### ❖ TECHNIQUES AND TOOLS USED IN THE QUALITY MANAGEMENT

A quality management system can be defined as a set of co-coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance. A quality management system enables an organization to achieve the goals and objectives set out in its policy and strategy. It provides consistency and satisfaction in terms of methods, materials, equipment, etc, and interacts with all activities of the organization, beginning with the identification of customer requirements and ending with their satisfaction, at every transaction interface.

The *Seven Basic Tools of Quality (Q7)* is a designation given to a fixed set of graphical techniques identified as being most helpful in troubleshooting issues related to quality. They are called *basic* because they are suitable for people with little formal training in statistics and because they can be used to solve the vast majority of quality-related issues. The *Seven Basic Tools* are a summation of methods that can be used to help us in solving problems:

- ❖ The systematic work requires:
  - introduction of simple methods
  - use of basic tools
- ❖ Improvement, Improvement, Improvement.
- ❖ Understanding the problem.
- ❖ Analysing the problem.
- ❖ Solving the problem.
- ❖ Involving as many employees.
- ❖ Support by management
- ❖ Proper administration.

The *Seven Basic Tools of Quality* are:

- ❖ The planning process, PDCA (Plan-Do-Check-Act)
- ❖ The Pareto chart,
- ❖ The list of mistakes,
- ❖ The cause-and-effect diagram,
- ❖ The brainstorming,
- ❖ The histogram,
- ❖ The control chart (the quality adjustment chart)

❖ THE PLANNING PROCESS

THE PDCA (PLAN-DO-CHECK-ACT) technique is mainly used by the quality improvement teams to solve problems. It includes the following steps:

- ❖ Problem recognition,
- ❖ Goal establishment,
- ❖ Problem analysis / Data collection,
- ❖ Problem definition,
- ❖ Processing the alternatives,
- ❖ Solution assessment and selection,
- ❖ Solution achievement,
- ❖ Checking the routine use of the solution.
- **Plan.** The current situation is analysed, establishing what is intended to do in the future. It is then assessed to what extent the system can meet the requirements, what changes are necessary for this purpose, which are the most important results to be obtained, whether the data obtained are enough, and what information is needed. The priorities are set, and the improvement plan is drafted based on the assessments made.
- **Do.** The improvement plan is applied (tested), to get the first information on its effects (possible outcomes).
- **Check.** The results (effects) of the application or testing of the improvement plan are assessed, identifying the critical points.
- **Act.** The results are studied and, if the forecasted improvements were obtained, the required measures are taken to: make the necessary changes in procedures, developing new standards or modifying the existing ones in order to harmonize with the proposed solutions. They can still be improved through a new plan, thus resuming the cycle.

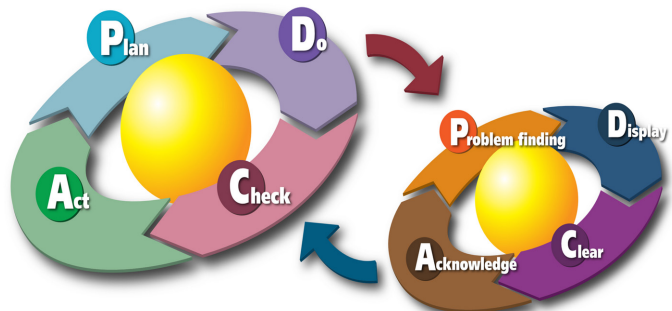


Figure 2. The Plan-Do-Check-Act Cycle (Extended diagram)

❖ THE PARETO CHART

By using the Pareto chart, the leading causes (those who have a great influence on the problem) can be filtered from a variety of possible causes. In this way, it is diminished the likelihood of us to start removing the unimportant causes, which would be done with great loss of time and costs.

Pareto-Analyse. Mistakes analyses between Jan-Dec 2010

Pos.	Mistake	Code of mistake	no.	%	cumulated %
1	Absense clip	0826	3	30.0	30.0
2	Short derivation	0951	3	30.0	60.0
3	Incorect montage	0995	2	20.0	50.0
4	Battered cage	0622	2	20.0	100.0

This is a chart where the cases are plotted according to their importance. Through this representation, the causes which have the greatest influence on the problem can be determined, helping us to decide in what order and with what causes we should fight.

#### ❖ CONCLUSIONS AND RECOMMENDATIONS

The vision, mission and targets of the Draexlmaier Group are not limited to theory. This is demonstrated by the trainings made by the senior management of each subsidiary, with the subject: Collaborators and Management/C4P

- Commitment,
- Competence,
- Cooperation and
- Communication for a better Performance.

The implementation of these trainings will be the key to the success of these efforts. The vision “We impose Draexlmaier as brand for the international automotive future” is already known as content. The requirements for the company, employees and structures are continuously changing.

For the Draexlmaier Group, it should be therefore a new quality of the organizational structure. It is mostly required a global network, under the full or partial representation of the main functions of the entire company.

From the employees we are expecting mobility of thought, power of action, motivation and appropriate flexibility. Whatever changes are required, it is necessary not to lose sight of the current tasks of the daily work.

Each department must continuously improve its business activities in conjunction with the activities of the other ones. In a relationship, each one is both customer and supplier. The product quality means the quality of each employee's work.

The care about the quality across the company is more easily understood if everyone is considered himself, when working, an “internal customer” for the upstream and, in the same time, as an „internal supplier” of the company, for the downstream.

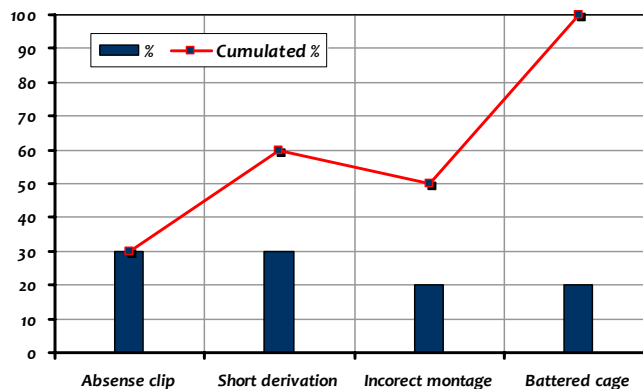
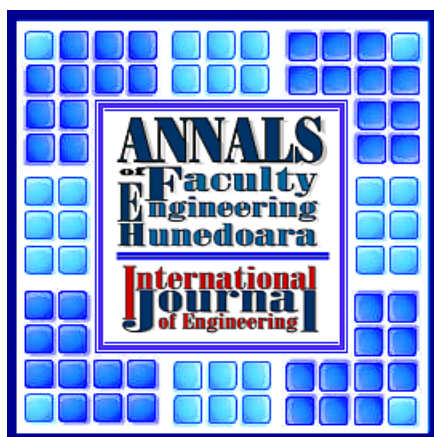


Figure 3. Pareto-Analyze

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