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The Importance of Human Resources in the Continuous Improvement of the Production Quality

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Abstract

In order to improve the production results, a number of techniques, methods or tools belonging to Quality Management and Human Resources Management can be applied to increase production capacity, the volume of manufactured products and the production quality. The paper aims to present the usage of quality tools and human resources management, in a company in the field of automotive production, to achieve positive results, in terms of increasing production capacity, the volume of products and therefore, their quality, through staff motivating as an effect of the usage and application of quality tools in the field of electrical and electronic equipment manufacturing for motor vehicles.

The paper highlights both the Quality Management tools applied within the company and a number of aspects that focused on the motivation and active involvement of the human factor in the processes of continuous improvement in order to increase the production efficiency. Applying the tools of Quality Management and Human Resource Management in all the production departments of the company has led to the identification of the causes that affect employees' involvement in the process of continuous improvement in production. After analyzing the identified causes, the management of the company has established to develop programs and actions involving employees in the continuous improvement process. These continuous improvement processes carried out in order to increase the production efficiency, have led to cost reductions, in the period under review, causing significant gains for the company.

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1. Introduction

The environment in which businesses operate is a fluctuating environment that changes from day to day in terms of legislation, technology, quality standards, performance levels and social values. These changes have implications on the human resources, for which the need for change has become a real need.

Of all the resources available to an enterprise, human resources are the ones that have direct contact with change and influences its successful development, which is why investing in labor force, in its training is an investment for the future, a sure way to increase efficiency and organizational performance, especially if it occurs in areas with a high potential for increasing the performance of the productive labor force. At the individual level, the change addresses the attitude, motivation, behavior, knowledge, performance, and at the enterprise level, it can target its functions, organization of production, structure of administration, technology, assignment of responsibilities, delegation of authority.

Staff motivation must start from the understanding of the problem. The manager must communicate effectively with the subordinates, effectively participate in their training and information through training programs, and get involved in practice through a direct example.

At present, each enterprise wants to have the most efficient and competitive staff. The staff implication can be realized through motivation. The employee wants to be paid fairly but also to be listened, understood and encouraged. The motivation of subordinates is not strictly related to material rewards. A number of non-peculiar factors can increase the subjective value of work, out of which one can highlight:

- appreciating the success of the employees;
- permanent information on the financial situation and the stage of achieving the objectives;
- encouraging the subordinates' initiative;
- increase the degree of freedom in decision-making in the work teams;
- attracting talents and intelligence.

For these reasons, the paper aims to explore the role of the human resource in the process of continuous improvement of production quality in a company from Mureş County which has an important presence on the Romanian automotive market, respectively on the automotive production, which is one of the most dynamic sectors of the economy.

2. Directions for action to improve quality

In the industrial production sector and generally in the Romanian economy, the attention paid to the quality of the products has become increasingly important in the higher management of the private companies, this being the main way of achieving their goals and the hope to achieve the expected satisfactions for consumers.

The increasing importance of quality in the production of automotive components has led the company to implement an integrated quality management system that has had a positive impact on the quality of production [1]. However, at the level of leadership, the need for continuous improvement of quality at all levels was felt, in order to increase the performance and efficiency of the activity [2], the company being active in an advanced competitive environment.

The needs for developing economic performance also aim to improve the skills of their own human resources [3] in areas such as: organization of work, design - sizing - measurement - control - improvement - company management, quality management, change management, risk management, project management, with direct consequences on labor productivity and performance competitiveness [4].

The importance given by the organization's management to improving the quality of its human resource [3] lies in the organizational awareness of staff being the most important source of ideas for process quality improvement [5]. But for this, it is important that in the process of change, top management ensures that staff in the organization have the authority, technical support and resources needed to operate the necessary changes to improve quality [6].

3. The process of continuous improvement of quality

In HR SRL company, the continuous improvement process is not just a requirement of the reference standard dealing with the quality approach in the automotive sector – ISO / TS 16949: 2009 [7], but is a way of life in the company.

The company has organized and developed its Production System taking into account a number of methods and tools to improve productivity and quality performance [2] at all levels in order to increase profitability. The implemented methods are:

- *Method 5S*, [8];
- *Standardization of the activity* [9];
- *Methods of continuous improvement of activity*. Among the methods applied in the company there are also methods that aim to involve employees in finding solutions to improve their business, solutions that do not involve costs or very high resources, but effective involvement of people in the development and improvement of their activity.
- *Visual management* means "the ability to understand the state of a production area in 5 minutes or less, through a simple observation, without using the computer and without talking to anyone." Visual management assures the signaling of the attainment conditions that can determine producing an abnormal situation so that a corrective action can be applied on time [10].
- *Methods focused on Problem Solving* are focused on finding the solution, identifying creative ways to solve problems that can be thought from other perspectives. From this category of methods, the DMAIC Method (Defines, Measures, Analyzes, Improves, Controls) is used in the company when seeking to improve existing products / services or processes [11].

All these methods are implemented and underlying the *company's Production System*, which is suggestively represented in Fig. 1.

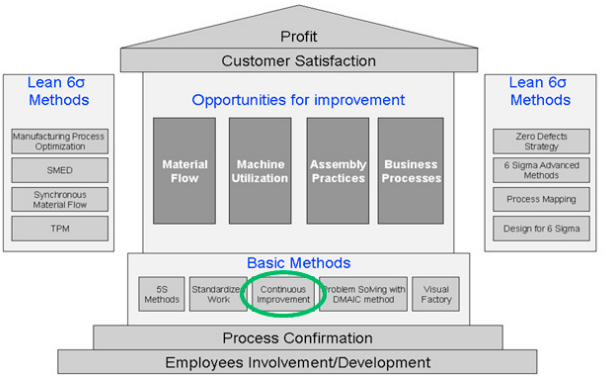


Fig. 1. Production System.

In the following, the paper aims to detail how the company has managed to train employees to find solutions to improve their business, solutions that did not involve costs or a high level of resources, but only the effective involvement of people in the development and improvement of their work.

Continuous improvement of activity across all processes is a basic method that contributes significantly to the company's goals. Supported by the company's management, continuous improvement work, along with other basic methods, has the involvement of all employees involved in this process through various means.

Employee engagement in continuous improvement is not just about decision-makers but starts from simple operators who are encouraged to propose and expose ideas for improvement.

In this purpose, in each workstation panels were specially designed for collecting ideas for improvement (Fig. 2). Panels were divided into three areas (Fig. 2a):

- Proposed Ideas - the area where the tickets are placed with the ideas proposed by the employees
- Ideas in work - the area where the tickets containing the ideas accepted by the decision makers are moved (Head of Section, Process Engineer, Quality Engineer);
- Finalized Ideas - the area where the tickets are moved after implementing the proposed ideas.

a b

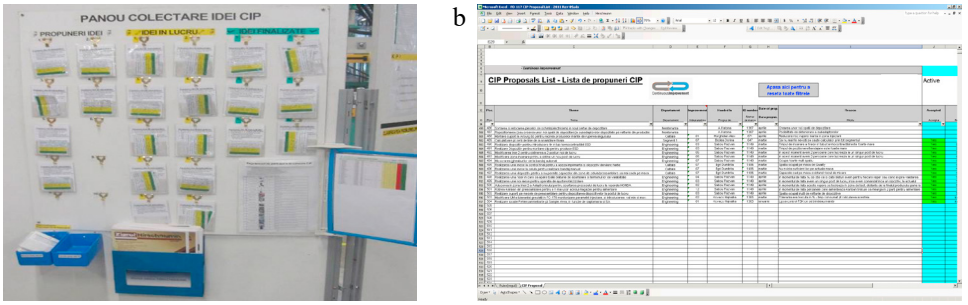


Fig. 2. (a) Collection panel *Ideas for improvement*; (b) Collection file *Ideas for improvement*.

Suggestions for improvement are centralized into an Excel file (Fig. 2b). In this file, improvement suggestions are divided into several categories: where the ideas are originated from, the process to be improved, the name of the person who proposed it, the reason for the suggestion, etc.

Depending on the amount of benefits brought to the company by the improvement suggestion, prizes are awarded. Each accepted idea receives a certain number of points, with the help of which it is possible to purchase personalized prizes, displayed in the specially arranged shop window (Fig. 3) in the main entrance of the company.

Fig. 3. Company awards for business improvement ideas.

Also, the motivational factors for employee involvement in the program for collecting ideas for improvement are analyzed, and actions are taken to motivate staff. Annually, the production department analyzes employee involvement [12] in the continuous improvement process by conducting a cause and effect analysis (Ishikawa Diagram, Fish Bone Diagram or Diagram 5M), which aims to identify the existence of causes such as defects in used raw materials, adjusting differences in the machines on which they are being processed, labor mistakes, methods of organizing the production, the environment in which the activity takes place. All these causes, known as "the 5 M", are grouped and graphically visualized in the form of a fish skeleton, the diagram illustrating in a clear manner the relationships between a certain identified effect and its potential causes (Fig. 4). The 5 M's are: Materials, Means, Methods, Machines, Man Power (Fig. 4a). The management team also participates in this 5M analysis: head of work section, engineers, shift leader, continuous improvement process (CIP).

Such analyzes are carried out in each of the five production sections and the results are grouped into 7 categories: knowledge, implementation, feedback, involvement, motivation, procedure, publicity (Fig. 4b).

a b

Fig. 4. (a) 5M Analysis; (b) Analysis of motivational categories.

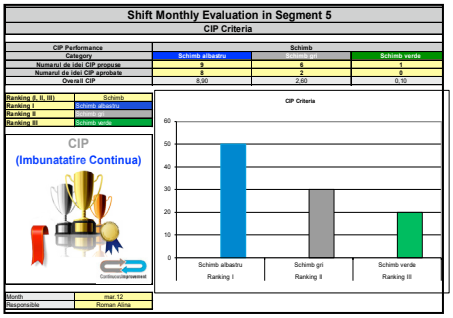
The results of the analysis were grouped into the following categories:

- *Knowledge:* outcomes - knowledge; difficult formulation; not working at the same workstation; there is no difference between idea and nonconformity; not knowing the location of the list of accepted ideas; the location of accepted and unacceptable ideas is unknown; unknown monthly or shift objectives; lack of inspiration and lack of time; operators are unaware of the CIP system; unknown ideas; lack of possibilities to formulate the ideas.
- *Feedback:* results-feedback; lack of feedback; feedback delayed; negative feedback from operators; lack of information
- *Implementation of operators:* results-involvement; non-involvement of operators; complains from colleagues; operators busy to fulfill the working load; lack of interest in ideas; norms are high generating lack of time; operators do not participate with ideas because they are busy with the rules; Ideas disappear from the panel (they are placed but soon are taken by other operators); Copy ideas under another form.
- *Motivation:* results-motivation; little scoring system for ideas; bonus 5S not granted; unmotivated operators; insufficient bonus; unfinished ideas; unattractive prizes; operators with ideas are not supported; many unacceptable ideas disappoint the operators; operators are not attracted by the awards made available by the company; lack of time and stress due to overcapacity requirements; ideas that get low score; operators do not have ideas because the score is small; operators do not see the benefits in ideas; too many points for prizes.
- *Procedure:* results-procedure; ideas are not accepted; small tickets; insufficient time to go through the ideas registration steps; fear of change; small points and the inability to get some prizes; the failure to solve many ideas leads to the low interest in writing ideas; unacceptable ideas; loss of ideas; misinterpreted ideas; failure to finalize ideas; lack of space to write the idea; no tickets are available to operators.
- *Publicity:* results-promotion; improvements are no longer feasible; missing symbolic prize for winning first place.

The management team analyzes the causes and sets out programs and actions designed to develop employee involvement in continuous improvement.

One of the methods used for this purpose is internal competition, which is introduced from shift level to section level. Internal competition ends with a *Segment Award with the highest number of ideas for improvement* (Fig. 5a) or *Employee with the highest number of ideas for improvement*.

a



b

ASSESSMENT of SEGMENT 5		☺	😐	☹
Segment Leader	A.C.	x		
Process Engineer	L.A.		x	
Quality Engineer	G. C.			x
Shift leader	H. A.		x	
Machinist Regulator	K. I.	x		
Shift leader	T. C.		x	
Machinist Regulator	C. I.			X
Shift leader	H. V.		X	
Machinist Regulator	S. B.			X
TOTAL		2	4	3

Fig. 5. (a) Ranking on shifts; (b) Team assessment.

Employee involvement in Continuous Improvement Programs is assessed annually by the CIP Coordinator in each work segment and feedback is provided (Fig. 5b).

The results obtained from the summation of the results for each work segment provide an overview (Fig. 6) about the involvement of leadership and support in the continuous improvement process.

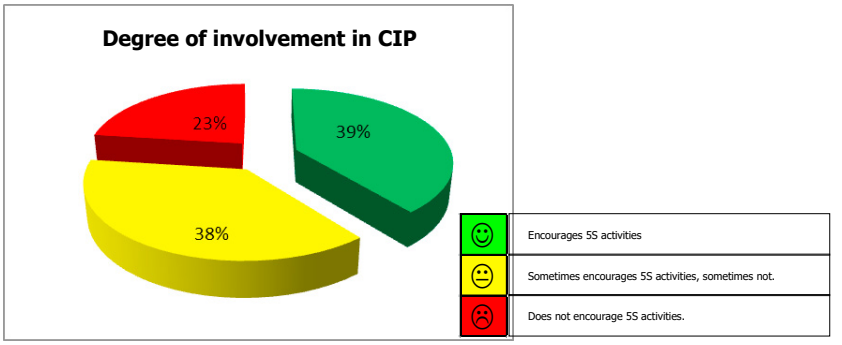


Fig. 6. The degree of involvement in the continuous improvement process.

Although not all suggestions for improvement can be quantified in money, the ratio between the amounts invested in implementing these suggestions and the benefits obtained (cost reductions) following their implementation highlights their favorable effect on the company (Fig. 7).

Cost savings 2017				
	Implementation costs	Savings (actions closed)	Savings potential (all actions)	Total savings
Euro	28.211 €	122.567 €	0 €	94.356 €

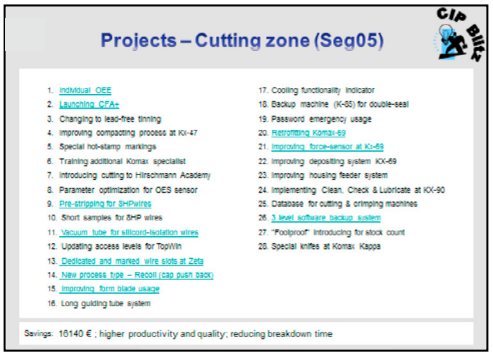
Fig. 7. Benefits results from improvement ideas in 2017 within the company.

For indirectly productive employees and support functions, the system for collecting ideas for improvement is completed with a "CIP Blitz", an illustrative document of the situation identified before the improvement and after improvement. This document aims to standardize good practice at company level.

If the idea of improvement is more complex, it generates an Improvement Project that is managed by a Project Leader. Generally, the duration of such a project extends over several months. In the following figure are presented the improvement projects carried out in 2017 within the work section that is the subject of this analysis (Fig. 8a).

Following the improvement projects, the cost reduction is synthesized annually in the Management Review meeting (Fig. 8b).

a



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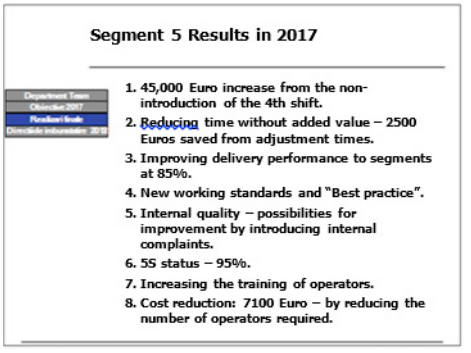

Fig. 8. (a) Improvement projects in 2017 in work segment 5; (b) Management Review.

The earnings for the company as a result of improvement projects on all segments amounted to 106 000 Euro in 2017 (Fig. 9).

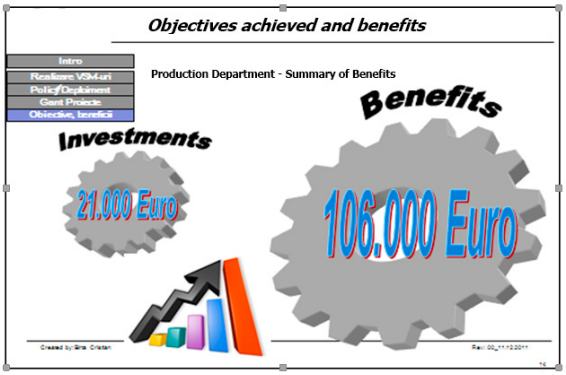

Fig. 9. Objectives achieved and benefits.

In conclusion, it can be considered that in any company, the Continuous Improvement Process should not only be seen as a requirement of quality standards but must be applied consistently in all activities, being the only process that guarantees sustainable development in harmony with the evolution of the macroeconomic and social environment.

4. Conclusions

The company performances in terms of quality can be ensured in the long term by constant efforts of continuous improvement. In this process of quality improvement, management must establish an environment where staff are fully involved and where the existing quality management system can operate effectively.

For the good implementation of ideas for improving the quality of production processes [13] within the company, the following can be recommended to the company management: setting the objectives and presenting the improvement project; analyzing the existing process and identifying opportunities for change; defining and planning the improvement process; implementing improvement; verifying and validating the improvement process; the evaluation of the improvements made, including the accumulated experience.

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