SMALL GROUP ACTIVITIES AS A METHOD OF SOLVING PROBLEMS WITHIN COMPANY – EXAMPLES

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Abstract: This paper is about the implementation of Small Group Activity (SGA) method on the example of production company. Given topic has been formulated in response to the problems identified by the company in the area of quality management and poor communication between staff. The objective of the study is to present theoretical concepts one of the methods of continuous improvement in the philosophy of Kaizen (SGA) and a presentation of the practical benefits provided its implementation. Based on the results achieved, it could be a very useful method in solving problems and improving workers engagement.

Keywords: Kaizen, continuous improvement, PDCA cycle, Small Group Activities (SGA)

1. Introduction

In the decade of 1980, management techniques focusing on employee involvement, and empowerment through teamwork approach and interactive communications and on improving job design were not new, but Japanese companies seemed to implement such techniques much more effectively than others. The business lesson of the 1980's was that Japanese firms, in their quest for global competitiveness, demonstrated a greater commitment to the philosophy of continuous improvement than Western companies did [1]. For such a philosophy the Japanese used the term Kaizen.

Kaizen means improvement, continuous improvement involving everyone in the organization from top management, to managers then to supervisors, and to workers. In Japan, the concept of Kaizen is so deeply engrained in the minds of both managers and workers that they often do not even realize they are thinking Kaizen as a customer-driven strategy for improvement [2]. This philosophy assumes according Imai that "our way of life – be it our working life, our social life or our home life – deserves to be constantly improved'' [2].

Improvement begins with the admission that every organization has problems, which provide opportunities for change. It evolves around continuous improvement involving everyone in the organization and largely depends on cross-functional teams that can be empowered to challenge the status quo [3].

The essence of Kaizen is that the people that perform a certain task are the most knowledgeable about that task; consequently, by involving them and showing confidence in their capabilities, ownership of the process is raised to its highest level [4]. In addition, the team effort encourages innovation and change and, by involving all layers of employees, the imaginary organizational walls disappear to make room for productive improvements. From such a perspective, Kaizen is not only an approach to manufacturing competitiveness but also everybody's business, because its premise is based on the concept that every person has an interest in improvement. The premise of a Kaizen workshop is to make people's jobs easier by taking them apart, studying them, and making improvements. The message is extended to everyone in the organization, and thus everyone is a contributor [5]. So, when Kaizen for every individual could be an attitude for continuous improvement, for the com-

pany also can be a corporate attitude for continuous improvement. As presented by Imai, Kaizen is an umbrella concept that embraces different continuous improvement activities on an organization as shown in Figure 1 [2].

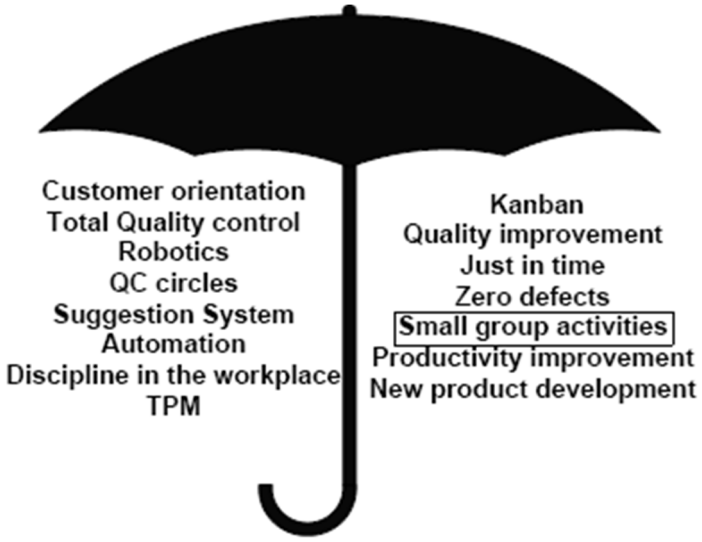

Fig. 1. Kaizen umbrella – concept
Source: Own elaboration based on [2]

The Kaizen methods and techniques (Fig. 1) are valuable instruments that can be used to increase productivity, to obtain the competitive advantage and to rise the overall business performance on a tough competitive market like the one in the European Union [6, 7].

According to James Womack in his book "The Machine That Changed the World" [8] with Kaizen, the job of improvement is never finished and the status quo is always challenged. Kaizen techniques became famous when Toyota used them to rise to world automotive leadership. Rather than undertake large projects, Toyota's staff was encouraged to identify problems, no matter how small, trace their root causes, and implement all necessary solutions.

2. Small Group Activities (SGA)

Small Group Activity is also known as focused or continuous improvement in English. SGA finds its origin in the Japanese industry where it is called "Kobetsu Kaizen" or Quality Circles. SGA is a method for problem solving in teams by structurally searching for the root causes and eliminating them. After standardization of the solution the reoccurrence of the problem is prevented. The feeling of ownership is intensified because those who are directly involved solve the problem in a multifunctional team [9].

The composition of the SGA is a team of people working on solving a specific problem or improve an important issue (optimal team size of 5-8 people). Team members can come from one or a variety of mini-businesses. The team determines the leader of the team members, who leads the team and organize its work. Who is in the team depends on the subject, which the group deals with. A significant proportion of people having direct contact with

the subject is crucial. A very important part line workers due to the development of their teamwork skills.

SGA deal with two types of issues:

1) the idea – simple and easy solution that can be implemented immediately (e.g. raising the height of the conveyor belt after which attracts displays for palletizing, thereby facilitating the work of the person which palletizing),
2) subject to improvement – a more complex issue, on which it must consider and work on a group of people, often from different departments. The time to implement such a topic could take several months (e.g. increasing the efficiency of the line).

The members of the team learn to use techniques (e.g. cause and effect diagram, Fish-bone-diagram) to find and eliminate root causes. The team is also taught communication skills, working in teams and decision making, in order to use each other's knowledge and experience [9].

The structure of an SGA project is derived from the PDCA-circle from Dr. W. Edward Deming and exists of 8 steps on the basis of the SGA circle (Fig. 2). The SGA team works independently and reports the progress by means of communication boards [9].

Fig. 2. SGA improvement circle
Source: Own elaboration based on [9]

Now will be briefly described the various stages of the process shown in Figure 2:

1. **Choose a subject** (it may be preceded by brainstorming) – presentation of the problem, determine how measurement, describing symptoms of problem, do not specify the reasons at this stage. Obstacles in the correct formulation of the problem: different perceptions, the formulation containing hidden solutions, the wording too vague.
2. **Set a target** – the objective should be determined by the team or the manager, objective should be measured in the same units what problem was, it should be made a specific execution date for ("as soon as possible" it is not correct). The objective should be: Specified and saved, Measurable, Acceptable, Realistic, Timely and ambitious (SMART).
3. **Problem analysis** – the purpose of this step is to identify all current or possible causes of problem (Tab. 1). Problem analysis investigates a situation/problem in order to allow the researcher to understand more fully the problem, in order to recommend practical

solutions for solving it. In addition, a problem analysis determines the degree of the problem and if the problem is a genuinely related to the specific site under investigated.

Tab. 1. Examples of tools that can be used in analyzing the problem

Tools	Purpose of using
Ishikawa diagram	Visualization of all possible causes
5 Why	It allows you to get to the root of the problem
5W + 1H	Ensures that it was asked about everything important in relation to a given situation

4. **Invent solutions** – involve the team in collecting facts and listen to everyone. Search solutions for the SGA should be based on facts, not opinions. The study and interpretation of the data needed are appropriate tools (Tab. 2).

Tab. 2. Examples of tools that can be used in data collecting

Tools	Purpose of using
Check sheet	The systematic recording of data to determine trend
Graph of the variable in time	Trend analysis within a specific period of time
The use of existing data (e.g. Shift reporting)	The requested data are already collected and sorted using a different method
Others (e.g. Consumer information)	The requested data are already collected and sorted using a different method

5. **Analyze/Interpretation of data** – search solutions for the SGA should be based on facts not opinions. Is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques and tools (examples of tools mostly used in quality management are on the table 3).

Tab. 3. Examples of tools that can be used in data interpretation

Examples of tools	Purpose of using
Pareto Analysis	Focus your efforts on causes that offer the greatest opportunities for improvement
Histogram	The graphic presentation of frequency distribution of the collected data (information)
Scatter diagram	Tool graphically showing the basic features of the problem
Control chart	Tool indicating whether there above the established parameters
Other statistical and graphical tools	Depends on tools

Make a planning – the action plans are prepared by team. Reject the current way of performing actions. Do not accept the status quo. Consider the issues:

– what we can do to make work easier?

- as people affected by action shall be informed, involved in their implementation and trained?
- can we build a system fault tolerant?
- are we introducing a temporary solution?
- is time for the implementation of a realistic?
- is the action plan is completed and approved?

Example tools that can be used: Ishikawa diagram, brainstorming, diagram T, analysis of force field, delphi method, exchange, collages and fantasies.

6. **Execute the solutions** – this stage is a bridge between theoretical activities in solving problems and bringing to the actual operation. Objective: Convincing decision makers for their solutions. The implementation of solutions requires the following: planning, training (if needed), communications, establishing a timetable for implementation (to establish deadlines for the review).
7. **Check if it works** – it should be established: How actions or results will be monitored and how often? Watch the results for some time to see if actions bring expected results. Is the objective set by the team has been achieved? If not, the team should decide to return to step 1.
8. **Standardize** – it occurs when the team finds satisfactory solution. Standard in this case means: the best, safest and easiest way, to achieve and maintain a defined quality level.

Based on the literature, the knowledge gained from the courses and training in Kaizen, and the practical experience of the authors, can be briefly describe the most important information related to the SGA.

SGA should be use when:

- problem is of interest to more than one person,
- there is no one simple answer,
- we want to involve the persons in solution (sometimes it is more important than the same solution).

The introduction of SGA should leads to the following results:

- team-building,
- improved communication,
- higher involvement,
- learn how to analyze and solve problems,
- realization of business objectives,
- continuous improvement,
- synergy – "two heads are better than one",
- motivation by engaging team members; their ideas are heard and supported.

Main advantages of SGA:

- team own solutions always refer with more enthusiasm than imposed,
- improving the relationship between the participants,
- group usually generates better solutions than the unit.

The vision for self-improvement SGA is spontaneously initiated from the bottom up. Noteworthy is that world-class companies 80% of employees involved in at least one SGA.

3. Case study

3.1. Case A

Company on basis of which we prepare our work have problem with bad quality of product. Manager decides to appoint SGA team for analyzing the problem. Team adopted Ishikawa Diagram for method of SGA (Fig. 3).

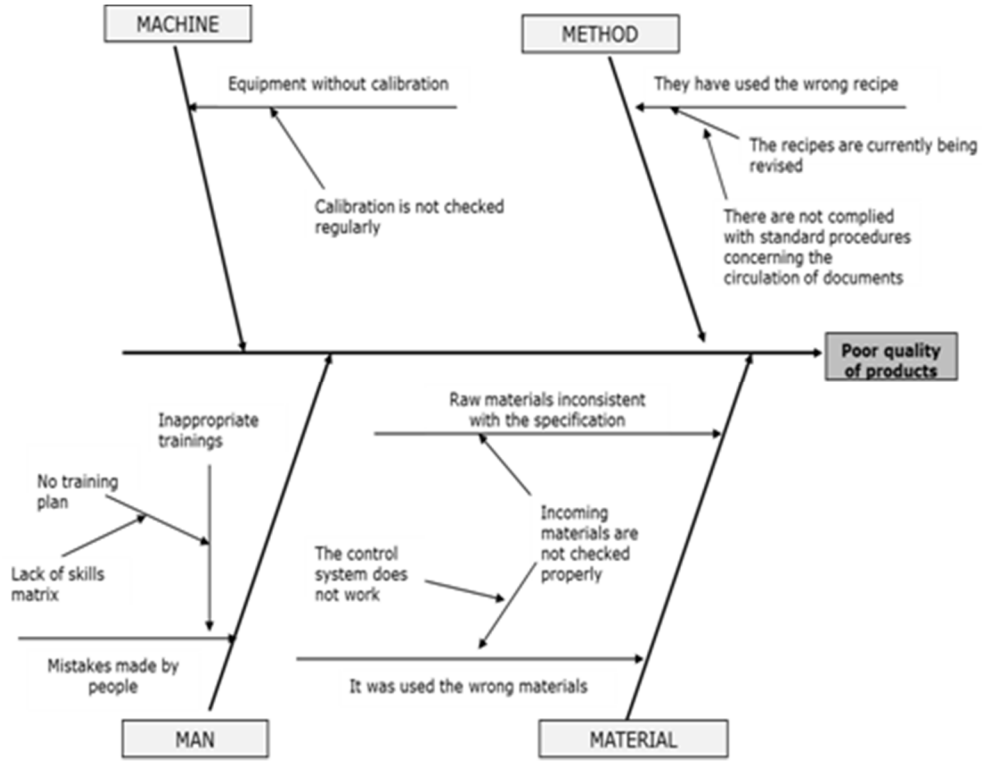

Fig. 3. Ishikawa Diagram prepared by SGA team

Company about which we write is from food sector, so it means that quality for them is crucial. According to this result of team work it was record that machine and man have crucial meaning for the quality of products. Going this track SGA team decided to apply the Pareto-Lorentz analysis in order to identify which components of the waste, such as waste materials, or stocks, generate the largest financial losses for the organization. Data were collected from all over the 2014 relating to different kinds of losses incurred by the company (Fig. 4).

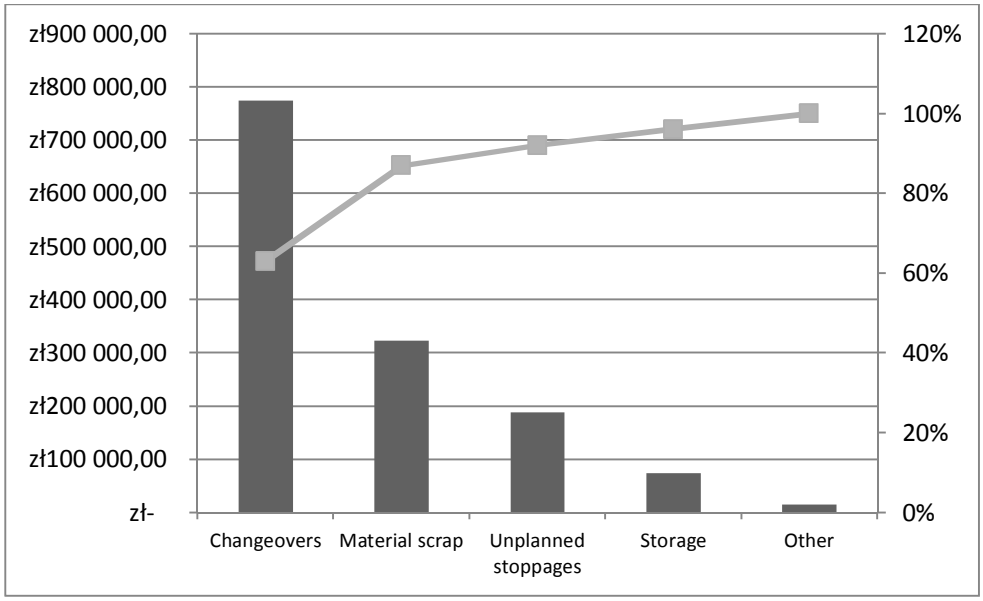

Fig. 4. Pareto chart prepared by SGA team

The analysis of losses in 2014 in the company, revealed that losses due to changeovers were the most severe for the entire organization. On the base of this conclusion it was decided to analyze the changeover - which are its main components (Fig. 5).

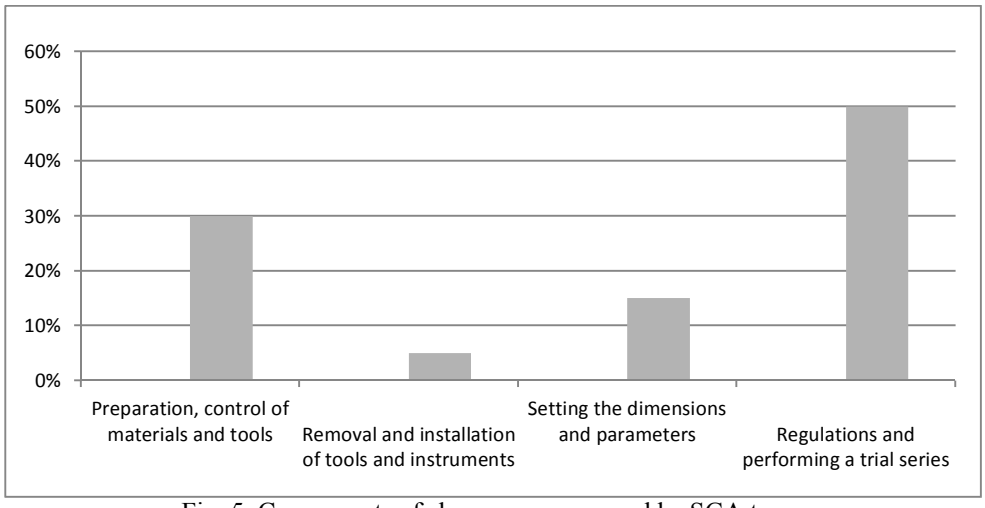

Fig. 5. Components of changeover prepared by SGA team

From the observations made in the company during the entire 2014 we can see that the changeovers in the 50% are consisting of regulations and performing a trial series. This conclusion returns us to the previous analysis of Ishikawa diagrams and accuracy of SGA group during poor quality of product analysis. Horrendously high value losses on changeovers caused global decision about TPM implementation, creation of regular and prevent

inspections and creation of skill matrix for workers. Further managers decided to start the production process improvement projects, such as SMED.

3.2. Case B

The production system of any business cannot function well without a well-organized internal logistics and the use of Lean Manufacturing tools can greatly affect the optimization of the flows of raw materials, components or finished products. Internal logistics - responsible for the proper flow, movement of all components, products to subsequent stages of production and delivery of finished goods to the warehouse - has a significant impact on the organization of the course of individual processes. Its functioning is often dependent on the production system used.

Company have problem with delivery components to internal customer on time, so there were no continuous production process. The managers decide to implement customer oriented culture. SGA was appointed to design production process with no stoppages and to analyze critical problems.

Before packages were stored in all free spaces in the production area. Dedicated places and any standardized process did not exist. SGA design process presented below (Fig. 6).

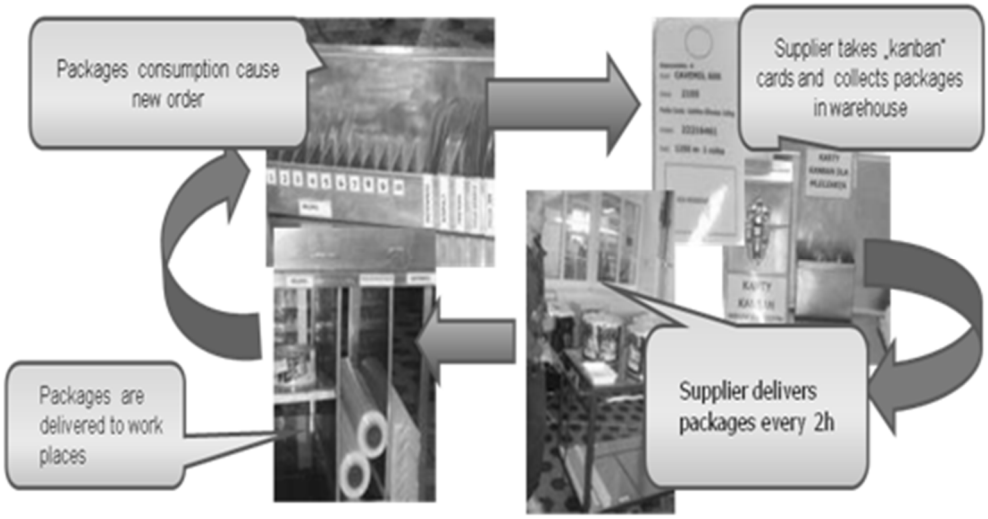

Fig. 6. Process of components delivery prepared by SGA team

SGA team designed a process (Fig. 6) based on pull production system - they implement using a Kanban card. This production system by using appropriate tools like Kanban card, allows you to eliminate overproduction, inventory, collecting packaging for production as well as the appropriate management and manipulation of materials or finished products.

Effects of that internal customer oriented culture was:

- packages delivery on time,
- free spaces on production area,
- better service for production process.

3.3. Case C

Increasing the efficiency of used resources is one of the most difficult tasks, which must face senior management production of company. The task is not a problem unless the company has free funds that can be spent on costly investments or purchase new machines. However, the increase in production efficiency can be achieved without incurring the high costs. Improvements of using resources in food production can be done by collecting and analyzing data from production conditions like temperature, density, speed of mixing etc. For this process high advanced knowledge of production line is need to redesign existing process and conditions of produced mass. This process is complicated, requires no small experience. You have to objectively approach the client's objectives, because the achievement of certain pre-set parameters can cause complications in the later stages of production. Therefore, the preliminary stages of conceptual require that participated in them top-class professionals, people with an open mind to new solutions, which often need to be checked in practical tests, not just theoretical.

Next example of SGA task was to increase output of owned resources with is presented below. Team first analyze the process of production and prepare the propositions of improvements with was implemented (Fig. 7).

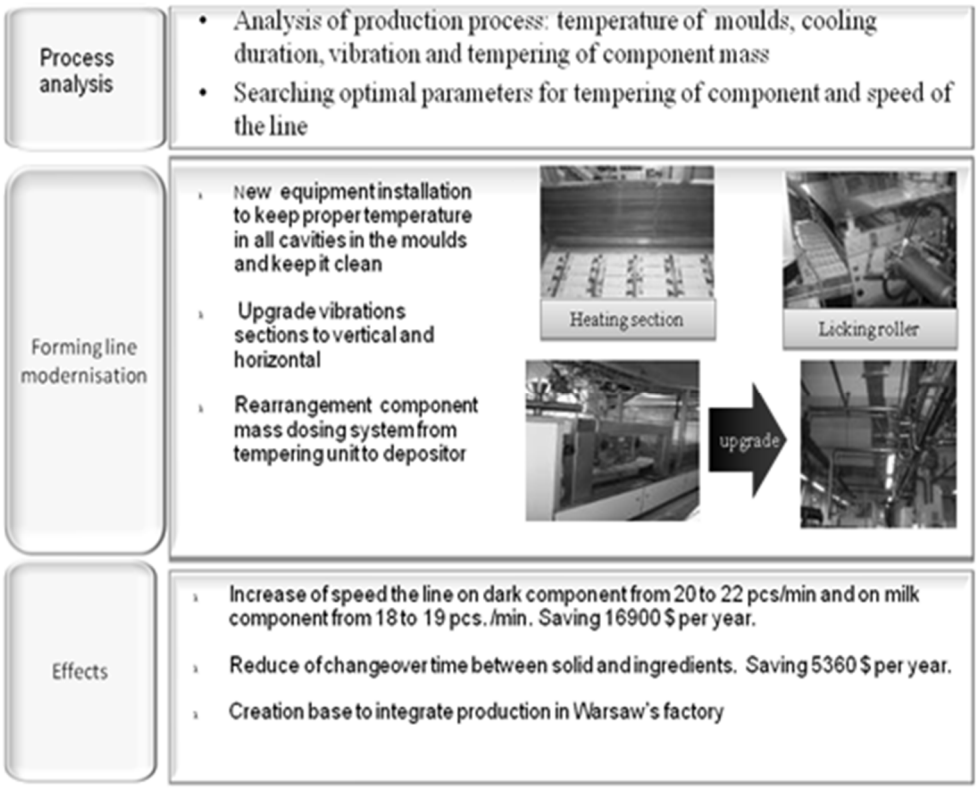

Fig. 7. Process of production improvement prepared by SGA team

SGA team prepare propositions of improvement for forming production line (Fig. 7) first they analyze production physical conditions and next they search optimal parameters for it. Team come up with new equipment installation to optimization temperature of heating section, vibrations were reprogrammed to vertical and horizontal to prevent adhesion to the substrate and dosing installation of mass was changed. Effect was measurable in money, because company saved almost 23 000 $ per year.

4. Conditions of proper SGA

SGA should contains no more than 10 people (5 – 8 persons), members volunteer for the team by themselves and they stay there to the end, there is a team culture of cooperation and trust, only superior of team members is its leader, in the team they are represented all relevant functional areas, the team has a goal of "compelling". Members of SGA should have:

- knowledge and experience,
- the ability to solve problems creatively,
- you should avoid people who actually will not continue to participate,
- credibility, ambition, initiative, energy,
- people who thanks to his contacts could facilitate cooperation with the project environment.

Leader of SGA team should on the first meeting discus the project (range, goals, schedule, methods procedures), interpersonal issues and way of team work. It is crucial for clear communication in team to specify the rules of planning, information exchange, implementation of changes and relation with environment.

5. Conclusion

SGA is suitable tool for every company to solve the problems, because it conducts to commitment of employees and increase in culture of company. Very important is role of leader of SGA and it must be reliable person. During work of SGA time must be planned, tasks should be prioritized to suit the course of the meeting to the time limits. Members should be active by asking them – not tell your opinion.

Our Case A shown that simple analysis of poor quality of finished products can be a starting point to the global changes in the company. A key factor which decided to implement the appropriate tools in the company were very high changeovers times, which directly resulted in large financial losses (Tab. 4). Shorter changeovers in connection with the standardization process of retooling the machine has a significant impact on the quality of work, which can have a measurable effect on the quality of the finished product, and above all, the financial result of the company. Project assume reduction of changeover times. Now it is about 340 min. in week and the goal is to decrease this time to 140 min. If it will be reached on one selected pilot production line the company will save 160000 PLN/year.

Tab. 4. Specification of changeovers

Specification	Unit	Value
The cost of operating hours of production line	[PLN/h]	1000
Average time of changeover	[h/week]	5,6

Next short Cases B and C was shown to reveal that by SGA we can also redesign main processes in production company and managers can't afraid of this, because as we see it can bring big savings for company. An important feature of the current production line is their flexibility destiny for several kinds of production and the smooth changeover, so as to maintain continuity of production.

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