Continuous improvement of the company as a result of knowledge access to Kaizen

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Abstract: Reproduction quality products must respect the production rate and possibly the lowest cost. Prices of production inputs – factors are related producers in various developed countries about the same. Options for reducing costs in the procurement of these factors are therefore limited. To improve the situation in costs the company can use basically two approaches to Business Process Reengineering (BPR) and Continuous Improvement (CI). Substantial Improvement (Reengineering) is a fundamental reconsideration and radical reconstruction process to achieve significant improvement in terms of performance measurement, efficiency, effectiveness (e.g. the cost, quality, service and speed). We do not look meticulously at what is there, but we will focus on what it should be. Gradual improvement (Continuous Improvement) in a company usually delivers small improvements, but a culture of continuous improvement can yield big results to improve the overall business. Continuous Improvement aims mainly to what the company is today and what action can lead to improvement. There is no single model and how to use each bind different types of improvement activities. In any enterprise system is tailored to specific conditions. Our goal is to present the applicable procedures of the implementation of the Kaizen method in the enterprise.

Keywords: Training Within Industry; Kaizen; Continuous Improvement; Rationalization proposals.

1 Introduction

Enterprises use different methods to reduce costs. One approach is Kaizen. Kaizen we have learned to perceive as a change for the better (good), thus improving generally. For this reason we say that it is a philosophy that focuses on continuous improvement in all areas of life. But Kaizen approach has benefited from massive training TWI (Training Within Industry). According Dinero, Charles R. Allen was a vocational instructor under the Massachusetts State Board of Education before World War I, and during World War I, when he was the head of the group that set up the shipbuilding training, he took these 4 instruction steps succinctly stated them as [1]:

1. Preparation
2. Presentation
3. Application

4. Inspection (or Test).

Allen developed training-training to shipbuilding already during the First World War. Training was called "J" program. Consists of 4 areas:

1. Job Instruction
2. Job Methods
3. Job Relations
4. Program Development.

After World War I, the United States emerged as the leading industrial power. During the first 50 years of the last century, American companies in such major industries as electronic, textiles, automobiles, and steel supplied most of the world's consumer and industrial products. If it wasn't produced by U.S. manufacturers, it either wasn't available or it wasn't as good.

2 Training Within Industry as a predecessor of Kaizen

Cautiously One of the reason for the success of U.S. manufacturing was the War Manpower Commission (WMC), formed by the U.S. government in 1942 to help industry train defence plant workers for World War II. The training program for industry according to Warren, Allen & Attner (2012) TWI has the theoretical base in the training program for industry, which was based on Charles Allen's 4-point method: Preparation, Presentation, Application, and Testing [8]. The Training Within Industry (TWI) service was created by the United States Department of War, running from 1940 to 1945 within the War Manpower Commission. As Dinero pointed out the purpose was to provide consulting services to war-related industries whose personnel were being conscripted into the US Army at the same time the War Department was issuing orders for additional materiel. It was apparent that the shortage of trained and skilled personnel at precisely the time they were needed most would impose a hardship on those industries, and that only improved methods of job training would address the shortfall [1]. By the end of World War II, over 1.6 million workers in over 16,500 plants had received a certification. The aim was to increase defence production for supporting of allied WWII military operations. The training within industry program covered the Five Needs of the Supervisor: Knowledge of the Work, Knowledge of Responsibility, and Skills in Instructing (Job Instruction, Skills in Improving Methods (Job Methods), and Skills in Leading (Job Relations) After World War II, the WMC was abolished in 1945.

Throughout the 1940s and into the 1950s, U.S. major competitors and trading partners – United Kingdom, Germany, France, Italy, Japan and most of its Asian neighbours – were engaged in recovering from the devastation of World Word II. With little or no competition, many manufacturers did not see the need to continue to improve. Most forgot the training within industry lessons. U.S. industries were dominant largely because they had no serious foreign competition and were untouched by both world wars.

But challenges came swiftly to most U.S. industries by the 1960s, and their impacts were magnified with the oil shortages caused by the major oil-producing nations, had discovered alternative products from several foreign nations that better met their needs.

Allen's four steps of instruction were published in various forms. According Dinero, M. J. Kane took the concept of Allen's four steps in 1940 and combined it with the concept of Key Points, fashioning the following TWI seven-step instruction [1]:

1. Show him to do it
2. Explain Key Points (how and why)
3. Let him watch you do it again
4. Let him do the simple parts of the job
5. Help him do the whole job
6. Let him do the whole job – but watch him
7. Put him on his own.

In November 1940, these steps, along with the "Key Point" concept, were incorporated in a bulletin, "How To Instruct a Man on a New Job". This was the program TWI ultimately used to train people to be lens-grinders. As result of this work, the training of people for separate jobs involved in lens-grinding was reduced from approximately 5 years to a matter of [4–6] months.

According to Dinero, later –TWI developers refined the M. J. Kane seven steps to four and created a training card (reminder card) for the JI 4/Steps [1]. The 10-hour Sessions were:

Job Instruction (JI) is a course that taught trainers (supervisors and experienced workers) to train inexperienced workers faster. The instructors were taught to break down jobs into closely defined steps, show the procedures while explaining the key points and the reasons for the key points, then watch the student attempt under close coaching, and finally to gradually wean the student from the coaching. The course emphasized the credo, "If the worker hasn't learned, the instructor hasn't taught". At the request of enterprises outside of manufacturing, variations to the JI program were developed for hospitals, office and farms.

Job Methods (JM) – a course that taught workers to objectively evaluate the efficiency of their jobs and to methodically evaluate and suggest improvements. The course also worked with a job breakdown, but students were taught to analyse each step and determine if there were sufficient reasons to continue to do it in that way by asking a series of pointed questions. If they determined some step could be done better by eliminating, combining, rearranging, or simplifying, they were to develop and apply the new method by selling it to the "boss" and co-workers, obtaining approval based on safety, quality, quantity, and cost, standardizing the new method, and giving credit.

Job Relations (JR) – a course that taught supervisors to deal with workers effectively and fairly. It emphasized the lesson, "People Must Be Treated As Individuals". Program Development (PD) – is the meta-course that taught those with responsibility for the training function to assist the line organization in solving production problems through training. There was also a short-lived course that taught union personnel (UJR) to work effectively with management. It was logical that after the Second World War the same education / training were used also in Japan, where the bulk taught and almost domesticated. The literature therefore rightly meets with the view that Kaizen is considered a "child" TWI. At the same time we understand it as part of Kaizen. TWI is basically just statistical control and to some extent controls the quality, especially technical. Historical developments have confirmed that the use of the method in Japanese companies during World War 2. The rehabilitation of destroyed country, produced positive results. Kaizen was a response to the need to restore the national economy and the Japanese nation as a whole.

Currently we regarded as Kaizen one of the most successful management techniques and is referred to as a means of Japanese "economic miracle". Kaizen is Japanese for quite a normal

way of thinking, which is learning from early childhood. Implementing Kaizen in the work area contributes to the continuing improvement in the various aspects of the business, whether they are business management, investment, supplier-customer relations, but also production itself, marketing.

The current view of the Kaizen is to aggregate marking techniques such as absolute quality control system rationalization proposals, the ring controls, zero defects of production etc. Understanding these methods alone (rapture of the total) and their actual use can never be effective. Kaizen is a collective term for different techniques that you take aim to improve any process. Kaizen is by Henry, a synonym for the continued improvement of anything, anytime [2].

It is not just about improvements in working life but also social and national. Masaaki Imai believes that will never happen there would not be room for improvement [5]. It is highly likely that the above mentioned statement will be eternal with regard to the constantly evolving field of science and technology. Japanese are accustomed to change and are opening them, it's part of their thinking. According to Kaizen day would not end without anywhere in the company did not, at least to some improvement. Margaret Rouse stresses, that the intention of improving processes is the active involvement of employees in problem-solving focus on reducing waste and ultimately reducing costs [7]. The overall levels of costs in the enterprise affect the financial position in two directions: economy and efficiency. Cost savings and efficiency in the use of production factors can lead to maximize the volume of production and business efficiency in maximizing profits. Kaizen is a daily activity whose purpose goes beyond simple productivity improvements. Unless Kaizen implemented correctly, it humanizes the work environment, reduce excessive hard work ("muri"). At the same time they teach people how to conduct experiments in their own work using the scientific method and how to learn to recognize and eliminate waste in business processes.

Kaizen efficiency assumes current work with three principles:

1. Thinking about the process and the results (not only of the results), so captured procedures leading to the results achieved;

2. Holistic thinking about the whole process and not just on the current view, in order to avoid creating gaps in other parts of the process;

3. Learning - not critical, not in search of the culprit (because blame is a waste), more analytical, allowing re-validate assumptions that prove the outcome of the current process.

The Kaizen process is concerned for taking part by people at all levels, from Executive Director to external collaborators. This process can be carried out single, consultation, small or large groups. In Toyota, this pioneered Kaizen as a rule, local improvements to a particular site or in a particular region and involves a small group of people who want to improve their own working environment and productivity. Group goes through the implementation of the Kaizen with the assistance of counsel. The successful implementation of Kaizen method assumes that each activity is seen as a process can be improved. Top management must be exemplary performance of duties; it is not enough just to take responsibility. According Deming production process is the basic issue of company. All efforts are focused on fulfilling customer expectations and for that it is necessary mutual cooperation within teams.

The philosophy is different from improvement programs, "commanded and controlled by" typical for the sixties of the twentieth century. Kaizen methodology includes making changes

and monitoring results, then adjusting process. Pre-planned large-scale projects are replaced by smaller experiments, which can be adapted as soon as proposed.

3 How to remove surpluses, loss and irregularity

The entire process approach applicable procedures of the implementation of the Kaizen method in the enterprise based on Deming's PDCA cycle (Plan, Do, Check, Carried out). All activities that Kaizen approach used to remove waste must be integrated in the PDCA cycle. At the same time, all activities must be geared to continuous improvement. As reported Matisková the overall effectiveness of this approach is reflected in increased productivity, the elimination of waste, in improving the performance of employees and ultimately the creation of added value [6].

Kaizen philosophy is based according Manktelow, J., Jackson, K., Edwards, S., Eyre, E., Cook L., Khan B. on the use of many tools that lead to a reduction in waste. The basic tool of access in this case is called Kaizen. "Five S" (5S) ". 5Ss is a checklist of good management to achieve greater policy, efficiency and discipline in the workplace. It is derived from the Japanese words SEIRI, SEITON SEISO, SEIKETSU and SHITUKE translated as sort, compare, clean, standardize and systematize [4].

- SEIRI (Separation) – The goal is to separate the necessary things from the unnecessary.
- SEITON (systematization) – The purpose to put things, tools to where it is most frequently used.
- SEISO (Cleaning) – This is the maintenance of the site and its surroundings, which should still be maintained to effectively carry out the work.
- SEIKETSU (standardization) – Continuous improvement and standardization of work organization. (That work is done in a simpler and better)
- SHITUKE (Discipline) – Each team member must be involved in the work to maintain the greatest possible efficiency and effectiveness of processes.

The 5Ss refer to the five dimensions of of workplace optimization: Seiri (Sort), Seiton (Set in order), Seiso (Shine), Seiketsu (Standardize), and Shitsuke (Sustain).

The 5S Program defines the steps that are used to make all work spaces efficient and productive, help people share work stations, reduce time looking for needed tools and improve the work environment.

Sort: Sort out unneeded items

Straighten: Have a place for everything

Shine: Keep the area clean

Standardize: Create rules and standard operating procedures

Sustain: Maintain the system and continue to improve it.

Every planned improvement is necessary to control the questions "why?" to the above five levels to guarantee the benefits of the improvements. This creates a justification for introducing changes.

3.1 Muri Muda, Mura

Through (S5) we limit, reduce, respectively remove the "Three M - (3M) 'that mean: muda, mura and muri. The aim of this method is to eliminate deficiencies that Japanese managers called "3MU". It is the interpretation of three Japanese words that symbolize those activities that are necessary to get rid unconditionally if he wants to make in addressing the problem reached a sensible solution and greater efficiency. Its meaning is as follows ("3MU"):

- MURI – surpluses overload
- MUDA – losses waste
- MURA – uniformity deviations.

Wastage in the company can include overproduction, defective products downtime and waiting, excess inventory, unnecessary work, excessive movements in the manufacturing process, unnecessary transport and the like. Mutual synergy Kaizen tools and management process is accessible so called Kaizen house.

Gemba Kaizen or Kaizen house according KII expresses the basic philosophy of this approach, which at the peak of construction, the house contains processes to achieve efficiency and effectiveness in managing and building the methodologies and procedures for effectiveness and efficiency of managerial control. This house Kaizen fully expresses the whole strategy Kaizen approach [3].

3.2 Practical application of Kaizen in a particular company

The goal was to streamline maintenance processes in the company through the application of Kaizen.

Step 1

We analysed the causes of the inefficiency of the process, which were characterized by high maintenance costs.

Tab. 1 Define causes high maintenance costs

Problem	Cause	Corrective Action
Repair costs	High failure rate of the device	Changes the maintenance system
The cost of of spare parts	The high cost	New supplier for the spare parts
energy costs	The high energy consumption	Replacing by alternative resources, conservation
Maintenance costs	Lack of preventive maintenance, poor organization of work	Establishment of a system of preventive maintenance
Wage costs	High idle and inefficient use of time fund	Coordination of activities, performance-based pricing

Based on analyzes, we found variations which have resulted in the following facts:

1. Low utilization of the available working time maintenance staff.

2. A high proportion of the performance of corrective maintenance in the field of mechanical maintenance - Troubleshooting.
3. Lack of staff to perform preventive maintenance.
4. Failure to perform preventive maintenance plan.
5. Technical deficiencies in facilities when performing preventive maintenance.
6. Lack of coordination in the execution of maintenance work.
7. Inability to modify terms of preventive maintenance during the year in the system due to objective reasons.

These fundamental deficiencies led us to make sure we have designed a system of corrective actions and quantified targets which the introduction of Kaizen be achieved.

Step 2

We set targets we want to achieve, and we compared it with current values and values that we have achieved after the introduction of Kaizen activities.

Tab. 2 Targeted and achieved values for the application of Kaizen

Indicator	The current value 2015	Target value 2016	Improvement [%]	2017 value achieved	Improvement [%]
The cost of spare parts	2 350	1 500	36	1 560	34
Energy costs	1 120	500	55	700	38
Maintenance costs	1 560	1 320	15	1 450	7
Wage costs	1 532	980	36	1 002	35
Repairs costs	5 260	2 500	52	3 600	31

Given the targets we suggested other remedies:

1. Streamlining the registration process, the absence of maintenance work on regular monitoring of attendance.
2. Ensuring coordination maintenance of the post - Coordinator of maintenance.
3. Operational distribution maintenance staff to perform preventive maintenance.
4. Modifying the terms of preventive maintenance on the system due to objective reasons.
5. The adaptation of the working environment in the maintenance department, t. j. arrangement of activities, materials, work equipment.
6. The introduction of pay for performance-based in order to reduce downtime in the workplace.
7. Change in supplier of spare parts.

After making and design corrective measures in the company we have seen improvement after a year of operation maintenance processes.

Step 3

We compared the target values against values achieved with measures in Kaizen. A retrospective improvements followed and the values measured prior to the imposition of measures. Values before the introduction of Kaizen is the present value of the costs of the 2015 targets we set for the year of 2016, the process we followed until 2017, when they were all made corrective actions. Based on the graphical representation of the benefits we can say improvements from baseline. However, the imposition of the measures we have failed to reach the level targets for each category of costs in the maintenance process. The overall improvement was there, but when summing up the percentage improvements we have failed to meet 49% cost reduction for each category.

Although the targets have not been met, we recorded within the maintenance process the following improvements:

1. Specification of events on specific technical place.
2. Capacity planning for maintenance to technical space.
3. Monitoring the availability of materials in warehouses.
4. Monitoring capacity maintenance departments.
5. Accurate quantification maintenance costs.
6. precise monitoring of implementation of the annual plan preventive maintenance.
7. Monitoring the proportion of preventive and corrective maintenance.
8. Monitoring of the effective time fund the maintenance staff.
9. Their remuneration based on performance.

Overall economic assessment can be given in the form of cost reduction Kaizen. Results in terms of reducing the cost of maintenance process represented a value of €3,510, which represents a saving of financial resources for the enterprise.

4 Conclusions of the analysis and idea

The idea: Why Kaizen is an appropriate tool for identifying problems in the company?

Masaaki said that Kaizen is the key to Japan's economic success. Use Kaizen really brings improvements for businesses in particular, in improving quality, increasing productivity, reducing inventories, shortening the production line, shortening downtime, and production time [5]. If the Kaizen philosophy began more fully implemented in terms of manufacturing enterprises, it could bring about improvements in process control and lead to a reduction of the cost of these processes. Kaizen is a system that should prevent losses, which significantly reduces the added value and lead to perfect production, for example JIT (just-in-time). If we want to present the results of Kaizen in terms of business concepts, Kaizen orientation would be as follows:

Toyota

The best example of putting into practice of Kaizen is a Japanese company Toyota. Toyota has the most symetric and most powerful cost management. Toyota production system in which

workers for decades systematically and uncompromisingly eliminate all unproductive activities, productivity is a model not only for the automotive industry.

The Toyota Kaizen started to use after World War II re-development of the company. Kaizen is manifested mainly in the Toyota system of learning, sharing of information, knowledge and experience through knowledge management, overcoming mindsets, respect and respect for people, teamwork, attention to detail, tightening things done and finding groundbreaking solutions. Toyota Production System (TPS) created on the basis of Kaizen at Toyota and its nature was in reducing costs and improving the quality of use of Circles of quality. It streamlines employee access, that part of the salary should be fixed and part unfolded on the amount of production. TPS has been developing for 70 years. It is a philosophy which is based on the applicable principles and functioning. From TPS it is based on the amount of the newer concepts, because there is no other way how an enterprise can develop.

During the development of Kaizen, the Toyota met with crisis and work was necessary to adapt the conditions of work more attractive to appeal to young people (and girls), thus modified and rationalized production and human resources development (HRD).

Toyota decided after the success of Kaizen in their companies support the implementation in Europe and America. Here, however, Kaizen met through a misunderstanding, because especially in American companies just raise demands on employees but did not adapt the conditions for development. later the conditzions changed and Kaizen became more and more attractive for Europe and America.

Continuous improvement Toyota for 25 years has increased productivity by 7 times while US automakers only 3.5 times. The time from the start of production to eliminate problems and achieve the standard, the planned power lines in the Toyota measured in days, in competing enterprises in the weeks and months. The productivity of designers and developers at Toyota is 4 times higher than that of American and European companies. In the US rankings for quality and reliability, Toyota consistently ranked in the top positions. If the US industry average in 120 problems per 100 cars sold and Toyota are the lowest - 101.

Pressure to reduce costs, TPS is a set of systematized ways these activities are beginning the design phase of the product, which shall be determined by reference costs and time. Then, in the workshop phase, the latter times and costs observed and constantly work on their improvement. They understood that the pre-production stages involved in product costs 5-10%, but their impact on cost is 70-80%. In this context, it seems quite illogical to seek cost reduction potential only in a production that costs are predetermined.

By Matisková practical skills that are essential to the success of Toyota are not only the individual elements of the production concept, but it's mostly the way you work with knowledge - workers in the development and manufacturing are constantly looking for problem solving, experimental, evaluate successful and unsuccessful solutions but above all learn, they expand the knowledge capital of the company by knowledge managers [6].

5 Conclusion

Any company that focuses its strategy on innovation can understand innovation with a diverse and diametrically different nature. Upgrade possible processes, products, working conditions, work organization systems, technologies and manufacturing processes, but all must lead to continuous improvement. Kaizen is the philosophy with respect to innovation-minded, but in some spheres evaluation diverges from the upgrade process. We confirmed that the

identification and analysis of problems in business practice is appropriate and highly usable Kaizen. In companies that address the problems of low production or non-systemic control can be applied Kaizen and the Slovak conditions. Kaizen improves and enhances the work and adds value. Kaizen is a tool of modern management and the need to use it because it helps to identify shortcomings in the various stages of the business process.

Example of Kaizen application in practice in Slovakia and the Czech Republic is primarily an automotive plant Škoda Auto. In the Škoda Auto board members initiated so called Cascade workshops. Each workshop is 5-day series of workshops with a team of 10-15 people directly on the production line, which begins on Monday and ends by the analysis of waste on the Friday by presentation of established solutions and savings. The workshops were held for several months. The benefits from one workshop ranged from 4 to 6 million Czech Crowns.

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