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Lean in the opinion of the employees of production company

Introduction
Management as one of the main task in business is a base for decision making and human resources process in every company. There are many traditional ways of supporting company’s management system that lead to good results. However, in order to exploit the full potential of the organisation, the modern solutions supporting management should be applied. One of them is Lean Management – concept that allows to make significant changes in the organisation. Its characteristic is “lean” management.

The origin of Lean Management comes from the concept of Lean Production (leaning the production) that was used for the first time in Toyota by Taiichi Ohno – then head of production and Eiji Toyoda – president and chairman [Womack et al., 2007, p. 9; Averill, 2011, p. 2]. During T. Ohno work in creating the Toyota Production System (TPS) known as “Lean Manufacturing” he observed the problem with the lack of the potential of sufficient resources. The solution concentrated on limiting the resources needed for production; people, area, investment expenditures, time and many others. The basis of Lean Management are: focus on customer needs, lean production, a continuous flow of materials and supplies in accordance with the principle of “just-in-time”, continuous quality improvement, accelerated development of new products and quickly bringing them to market, active marketing, care for customer needs and expectations, ability to develop and gain strategic investor, harmony with the environment of the company [Garza-Reyes, 2015, p. 18]. Companies are deciding to implement Lean Management to improve the quality of production process by reducing the number of defects and repairs. The
operational costs are lower because of lower demand for production resources. Moreover Lean Management makes employees from strategic and operational level more involved in their work. They could be more effective in identification of steps to main aims at work.

The aim of this article is to present concept of Lean in the opinion of the employees of production area of manufacturing company from the metallurgical industry. The research concentrates on the assessment of the knowledge of main elements of the Lean Management by production employees.

By conducting the research Authors were focusing on what employees from production area know about the concept of Lean and what tools do they use in their everyday duties at the workplace. The survey was taken as a research method.

1. The essence of Lean

The history of Lean Manufacturing starts in 1926, when Henry Ford published his work Today and Tomorrow. The concept introduced in this book and the ways of waste identification were developed and continued by T. Ohno in Toyota Production System: Beyond Large-Scale Production [Charron et al., 2015, p. 4]. They were the basis for manufacturing system created in Toyota known as Toyota Production System (TPS) and Lean Manufacturing [Wincel, Kull, 2013, p. 1]. However, waste identification methods were also absorbed by other management areas [Womack et al., 2007, p. 28].

The Lean concept differs from other concepts that concentrate on process improvement. It does not allow to improve the current state by increasing the effectiveness of all activities in the company but it requires the evaluation of those activities for their actual utility. In Peter Drucker’s opinion “there is nothing quite so useless as doing with great efficiency something that should not be done at all” [Womack et al., 2007, p. 31; Shore, 2015]. This quote connects with the concept of Lean that reduces all actions and functions that do not bring any value for the customer [Zokaei et al., 2013, p. 38]. Moreover it concentrates on the reduction of internal actions in the company to the ones that are absolutely needed. It focuses on customer’s needs and defines what’s important for the customers in the product. The value stream within the company has to be defined (all actions that have to be done to create product or service) so the company could focus on the costumer’s needs. Then the value stream of the entire
supply chain has to be defined [Kowalczyk, Nogalski, 2007, p. 63]. Customer satisfaction requires the elimination or at least reduction of some unnecessary actions that generate waste in the supply chain. The next step concentrates on finding the way to create the guidelines, targets and methods for assessing progress [Senge, 2006, p. 41]. Competing is not the target according to concept of Lean, but perfection and total waste elimination. The Lean transformation is an extremely long process, the thorough analysis should be conducted, deciding what methods and tools will be implemented. Then such proceedings will substantially eliminate the risk that is connected with the lack of the interpretation of definition of implied techniques and Lean tools by the people who implement it [Senge, 2006, p. 64].

2. Lean – methods and tools

The application of Lean methods and tools enables to eliminate the sources of waste, unnecessary actions and causes of defects that have a huge impact on the quality. Moreover it reduces costs and removes the restrictions and obstacles to rise in productivity [Garza-Reyes, 2015, p. 18; Mann, 2015, p. 15].

One of the most significant method is Kaizen, known as continuous improvement [Imai, 2007, p. 18]. Kaizen means change for the better and it concentrates on step by step improvement and taking the little steps that lead to high results in a long term. It is a common-sense and low-cost approach in management with a low risk of incurring high costs when returning to previous methods [Imai, 2006, p. 40].

The Kaizen implementation gives the organisation various benefits such as [Kaizen Institute, 2015]:

– shortening the time of the process – so the organisation could be more flexible,
– elimination of stock – lower costs and less storage space,
– elimination of defects, mistakes and accidents – higher quality, lower production costs and less complaints,
– better use of equipment and machinery – higher performance with lower costs,
– improvement of the administration processes – better communication, lower costs.

The next significant Lean method is 5S. The main goal of 5S is keeping the right order and reasonable management of the resources at the
workplace so the wastes are eliminated. It focuses on work improvement actions so the expected quality of products with lower production costs is achieved. The full name of 5S comes from Japanese words that describe the next steps of it so it operates in the right way [Czerska, 2011, p. 171]. 5S emphasizes the selection that means eliminating all things that are unnecessary at the workplace. The first step is to leave things that are needed and necessary. It is also very useful in production, giving very good results in the production process by improving the communication, workplace in the organisation and saves time [Kornicki, Kubik, 2008, pp. 23–24]. The next step focuses on systematic actions so after selection only things that are necessary are left on workplace. Then the exact place for each item has to be defined and the employee knows where to put off things exactly. The place where all tools and documents are has to be ergonomic and easy to reach for employees. Visualisation is a helpful tool to make this step work so it helps with organising the right place for tools and equipment. By visualisation the workplace is shown in an easy and understandable way for employee, so it helps saving time, improves work and makes working environment safer. The next 5S step is cleaning which supports all previous actions. It necessary to clean the workplace and sustain it as daily and very significant action. Moreover to avoid the breakdowns all equipment have to be checked systematically [Selejdak et al., 2012, pp. 43–45]. The forth 5S step is standardisation that is based on implementing and improving standards for working environment. It combines the first three steps – 3S. Firstly, the processes have to be improved and then standardised so every employee is able to understand them and make them. Standard is a key issue in starting all improvement actions. The better standards lead to improvement in all organisation so the costs and wastes are reduced [Kornicki, Kubik, 2008, pp. 10–12]. Self-discipline is next 5S step that requires adaptation to specific rules [Selejdak et al., 2012, pp. 26–27]. All employees have to be engaged in previous procedures so self-discipline is associated with constant use of all 5S steps to maintain order, follow the procedures and labour standards. Audits are very useful tools for proper functioning of 5S. They help to detect irregularities in all units of the organisation [Selejdak et al., 2012, pp. 26–27].

Total Productive Maintenance (TPM) is a Lean tool that enables to use the equipment and machinery in the most efficient way. The aim of this tool is to avoid all kind of breakdowns and stops in the production. TPM concentrates on continuous improvement of machinery park by
monitoring the work efficiency indicators and minimising the number of defects during production process [Matejczyk, 2010, pp. 5–11]. TPM helps to lower production costs. The actual amount of savings will depend on the current state of the production system and the type of the production. If the machinery park is performing well, organisation may concentrate more on other possibilities of the improvement of production system such as skills of machinery operators [Mobley, 2008, p. 145]. The TPM implementation requires trainings and new procedures of data collection. It results in improved equipment reliability and reduced its unnecessary use.

Another Lean method is Single Minute Exchange of Die (SMED) that was initiated in the 50s and 60s of the 20th century by one of the greatest representatives of the Japanese management school – Shigeo Shingo [Rozwadowski, 2010, p. 198]. It was initially used in the automotive industry then adapted for other industries. Now it is used to improve labour productivity and elimination of bottlenecks in the production systems. It concentrates on the elimination of changeover time of the machinery and equipment [Charron et al., 2015, p. 12; Czerska, 2011, p. 71]. This method requires the use of several steps; preparation, separation of internal and external retooling and modernisation of all aspects of the changeover operation. The importance of the preparation stage of SMED focuses on identifying the organisation of work assigned to the position held [Rozwadowski, 2010, p. 198]. The team responsible for the project should keep in mind each machine and equipment unit individually in order to reduce changeover time. The design process should start from the bottleneck machine [Nowakowski, 2010, pp. 3–5]. The gain in this way is that the whole system functions better. In many cases the changeover of bottleneck takes too long but any time gained can be effectively used by the employee for other purposes.

Value Stream Mapping (VSM) is a technique that shows in a graphic way how the production system functions, taking into account various types of waste and designing the target state [Walentynowicz, 2014, p. 263]. It is used to analyse all work activities in the organisation. Thus, an important element in identifying factors that function incorrectly. Even if the organisation is performing well after the VSM application there may be some areas disturbing the materials or information flow [Rother, Harris, 2009, pp. 3–4]. The mapping process is very useful for picturing the processes and their problems. It is beneficiary for the company by shortening the flow of a product, quality and work efficiency improvement and
increased financial liquidity [Womack, Jones, 2005, pp. 75–79]. VSM shows the stream of a value from customer’s point of view. It applies to all internal processes occurring in the company and combines all of actions in the process to deliver the final product to the customer [Sayer, Williams, 2007, pp. 49–51]. Moreover it helps with waste identification and reduction that enables to plan the whole system correctly. In order to analyse the process with mapping, series of steps should be considered; analysis of current and future state and improvement plan [Sayer, Williams, 2007, pp. 49–51]. SMED and VSM are mentioned and described to show the variety of Lean methods and tools for continuous improvement of the company.

3. The results of the research

The research on the effects of the Lean implementation in the opinion of the employees has been taken in the production company from metallurgical industry located in the area of Tricity (Gdansk, Sopot, Gdynia) in the north of Poland. The study was conducted in February 2015. The company that was chosen was successfully implementing Lean tools and methods within three years to increase business efficiency.

The questionnaire was distributed to all employees at the production. After analysing the correctness of filling the questionnaire, three were rejected, so the results present the opinion of 32 employees. Of all respondents 94% declared participation in Lean trainings. While the knowledge of Lean idea is known by 82%, declaring that they understand the definition and how to implement it in practice. Out of production employees who work at this company at least three years, not everyone is aware of how long Lean has been introduced in their company. About 85% of those employees knew that such activities are carried out. The factors according to employees that were the case of Lean implementation (table 1), were requirement of management (50%). The results of the conducted research show that the majority of the respondents (81,25%) think that Lean actions include only area of production, others declare that Lean is also introduced in non-production areas of the company. The next step of the research was the question regarding type of wastes (MUDA) in the company.
Table 1. The reasons of Lean implementation in researched company

<table>
<thead>
<tr>
<th>The reasons of Lean implementation</th>
<th>% of employee at the area of production</th>
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<tbody>
<tr>
<td>Gaining competitive advantage</td>
<td>3,13</td>
</tr>
<tr>
<td>Improving business performance</td>
<td>3,13</td>
</tr>
<tr>
<td>The requirement of business partner</td>
<td>28,13</td>
</tr>
<tr>
<td>The requirement of management</td>
<td>50,00</td>
</tr>
<tr>
<td>Do not know</td>
<td>15,62</td>
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</tbody>
</table>

Source: Own elaboration based on conducted research.

Indicators in the questionnaires focused on the following type of wastes; the occurrence of machines and equipment failures (21 indications), unnecessary actions in the production (12 indications), defects (5 indicators), unnecessary transport and too many tasks (each 6 indicators), excessive quantity of information and unclear information (2 indicators). All respondents said that the quantity of defects in the area of production and machinery park decreased in the last year. In the questionnaire a brief characteristic of Lean tools has been introduced to respondents. The following presented tools are: TPM, SMED, 5S, VSM. The respondents have been asked to which tool has been used in the company. The choice of tools was made after discussion with the members of board who declared the use of such Lean tools. The research results were shown that all respondents knew 5S from practice, while only 6 employees declared the use of SMED, and 4 employees the use of TPM. None of the respondents knew the idea of VSM. Employees were also asked what steps of the entire production cycle are significant in the concept of Lean. The highest weighting (scale 1 to 5) received “on time delivery” (4,69), then creating good relation with suppliers and customers (4,31). The importance of minimising the inventory was on 3,11 level and shorten the production time on 2,52. The least important factor for employees of production area turned out to be the use of maximum capacity of production (weight = 2,48). In the last stage of the study the respondents were asked what are they associating the concept of Lean with. The most of the respondents (62,50%) associate Lean with an increase of work efficiency. The introduction of improvements and innovation are identified with Lean by 21,87% of the respondents, while the concept is also identified with redundancy by 15,62% of the researched employees.
Conclusion

The results of the study show that not every employee of the production area knows the concept of Lean, despite the fact that in the researched company trainings from the area of production management and Lean are successively held. The greatest attention should be paid to the lack of information among production employees regarding what tools do they use in the production process. Most respondents clearly indicated the positive contribution of Lean in the company and the reasons for its implementation. Understandable, for many researched employees, were the effects that can be achieved thanks to Lean. They noticed what specific areas have changed under influence of improvements in the organisation and what type of waste has been identified. They also drew attention to the redundancy, which they believe is caused by the introduction of Lean.

Employees of the production area know that the modern concepts of management function in their company, but do not know how to identify the various tools that make it. In order to maintain adequate awareness of all employees, system of trainings should be intensified in the company. These meetings would have to explain the continuous improvement philosophy in the organisation. It would be also important to engage the employees in solving manufacturing problems and finding new and innovative solutions at work.

References


Lean in the opinion of the employees of production company
(Summary)

The paper presents the results of the research carried out in the production company (metallurgical industry). The analysis shows that the main motivating factor for the introduction of Lean activities were management requirements. As a result of the implementation of Lean methods and tools, the amount of breakdowns of machinery and equipment were reduced and quantity of manufacturing defects were decreased. The study presents that employees of the production area do not associate the various Lean tools and do not know how to use them. Moreover they are afraid of dismissals as a result of Lean improvements.

Keywords
lean, lean management, production company