



## SHOPFLOOR MANAGEMENT (SFM) AS A TOOL FOR IMPROVING CONTROL OF PRODUCTION AND VISUALIZATION OF RESULTS

Maciej Ciszewski, Magdalena K. Wyrwicka

Poznan University of Technology, Poznań, Poland

**ABSTRACT. Background:** Due to the small number of scientific publications covering the area of implementation of Lean Management in small and medium companies, this paper presents the observation and analysis of obtained results, which could be the basis for the implementation of Shopfloor Management (SFM) as a tool for improving both the operational production control as well as the visualization of results in small and medium companies (SME).

**Methods:** The researches consist of the comparative analysis based on the scientific literature and the observation of effects of implementation of SFM method in selected company from the SME sector.

**Results:** The advantages of the implementation of SFM method were found in such areas as: simplification of organisational solutions, use of visual management and shaping the desirable competencies of leaders.

**Conclusions:** The presented results show that coordinated and constantly implemented Lean elements in the company from the SME sector, which previously did not use any tools of this concept, can give a significant increase of turnover, prompt eliminations of shortages as well as the change of the attitude of all employees to continuous improvement. The positive effects of Lean implementation, based on SFM method, were confirmed empirically.

**Key words:** effects of Lean implementation, production management, Lean Production, Shopfloor Management.

### INTRODUCTION

Dynamically developing enterprises are currently facing several problems related to the coordination of the flow of goods and information in production departments. To keep up with the dynamically changing market environment, it is necessary to pay special attention to the effective management of the production process. There should be an area to reduce operation times, eliminate losses, increase efficiency and improve the quality of products. Opposing the expectations of directors and production managers, management methods derived from the lean philosophy come out.

The paper shows how individual areas of the enterprise have changed after the

introduction of one of the methods supporting effective operational management of a production workshop, which is derived from the concept of Lean Management. Consistent use of Shopfloor Management techniques helps to make quick decisions, identify deviations in production results and effectively solve problems related to workshop management that appear in the production system. Present research [Alkhoraif, Rashid, McLaughlin 2019] demonstrates the lack of information and knowledge concerned with the implementation of Lean Production in SMEs, in comparison with implementation among LEs. This research aims to bridge this gap through both academic research writings referring to the implementation of lean tools and showing effects of implementation in Polish steel company described by several indicators. The aim of this study is to present

the effects of the implementation of the above-mentioned Lean Production method in the area of control of the production department in the medium metal industry company. The benefits of simplifying the organization, the use of visual management and implementing the desired competencies of masters and leaders are presented. The analysis and assessment of the phenomenon were carried out in two ways: based on literature studies and the basis of participatory authors observation.

## THE ESSENCE OF THE LEAN CONCEPT

The concept of Lean Management comes down to limit and avoid broadly understood waste. The literature presents many benefits of implementing lean tools. The most frequently mentioned include: increasing competitive ability, increasing the productivity of the company, reducing costs and improving the quality of production, increasing work efficiency, paying more attention to the needs and wishes of customers, growing employee satisfaction, stronger employee motivation and identifying with success of the enterprise. The most commonly used tools in Lean Management as logistics strategy include Value Stream Mapping, JIT, Open Book Management and others applicable in Lean approach for supply chains [Hadaś, Stachowiak, Cyplik, 2014]. Today, Lean Management is no longer limited only to production but enters into other areas of business activity and the sphere of services. New areas of application of this concept are: Lean Office, Lean Logistics, Lean Product Development, Lean Supply Chain, Lean Customer Service, Lean Accounting, Lean Administration, and Lean Healthcare [Trenkner 2016]. A special feature of the lean philosophy is to point the direction of improvements based on defining what is added value and what is a waste [Jasińska, Żurek, Wyrwicka 2015].

The concept of Lean enables entrepreneurs to develop and improve their market position. Contemporarily, the implementation of Lean Manufacturing is methodically elaborated under the assumption that waste elimination, which can be divided into nine categories

(overproduction, motion, waiting, transportation, inventory, defects, over-processing, not-utilized talent and unsafe or unergonomic working conditions), can be guaranteed by the application of a few organizational techniques in a defined sequence [Wyrwicka 2009]. Among them, the mainly implemented include:

- Workplace organization – 5S – sort, set in order, shine, standardize and sustain
- Visualization of work and its results
- Standardization
- Complex maintenance – TPM (Total Productive Maintenance) – based on all employee involvement to identification, monitoring and eliminating wastes resulting from: breakdowns, equipment setup and adjustment, idling and minor stoppages, spills and process upset conditions or not satisfactory quality
- Fast refitting – SMED (Single Minute Exchange of Dies) – all methods focusing on reducing changeover and setup (it should be no longer than 10 minutes)
- Implementing quality in processes
- Continuous improvement.

In the area of production, the Lean Management philosophy is carried out as Lean Production. One of the features of Lean Production is the striving for failure-free production, and cleanliness and order are the basis for healthy processes [Cyplik, Hadaś 2013]. The philosophy of Lean Production from traditionally understood production distinguishes the implementation of continuous flow and unit production or in small batches. Another feature is the desire to radically reduce inventory and to engage the entire staff in processes improvement. Lean Production is derived from the industrial practices of Japanese Toyota, whose international expansion and excellent economic results have led to the spread of this idea in the US and Europe [Aluchna, Płoszajski 2008]. The success of the implementation of Toyota Production System (TPS) results from the fact that it was introduced from the beginning of establishment of the enterprise and put into practice consistently. It is claimed [Cusumano 1994] that at Toyota in the late 1980s, the output per worker was two to three times higher than at US or European plants. A critical foundation is a TPS culture of

continuous improvement which relies on attracting, developing, and engaging outstanding people, solving problems at all organization levels, making management accountable to employees, workers to be devoted to the company, family, and society, having HR department as the arbitrators of fair and using a top-down and bottom-up planning process to enable everyone to be involved in achieving goals [Liker, Hoseus 2008]. Whilst being considered the industry standard for systematic productivity improvement, the success of Lean in a large variety of industries is tainted by many failed implementations [Pearce, Pons, Neitzert 2019]. Failures in the putting into practice processes of lean philosophy and practices in production environments are largely due to the inadequacy of theories derived from the TPS or a lack of understanding thereof. The TPS is a system whose functioning depends on a correct interrelationship between all its elements, not a partial application of its tools. Before its implementation can begin, it is thus necessary to establish a holistic vision, in order to accurately understand TPS concepts and principles [Cruz, Figueiredo, Passos 2019].

At the core of the concept of lean attitude lies the development of employees and the continuous improvement of production processes. The main characteristics of Lean Production are, among others, standardization of work, Just in Time deliveries, embedding quality into the process, one-piece flow or pull system. When it comes to the level of the physical production of goods with the characteristics desired by customers, we are talking about the concept of Lean Manufacturing. The main element of Lean Manufacturing is the immediate identification of errors and their immediate elimination.

Lean Production supports the process of exclusion of waste and allows to synchronize production in value streams with the help of pull system and tact time. The pull system is closely related to the customer relationship, both internal and external, and consists in the fact that it is necessary to produce exactly as much as the customer needs, on the date he/she ordered. This allows overproduction to be avoided and stocks that would otherwise occupy space and lose their quality with the

passage of time are not created [Pawłowski, Trzcieliński 2010].

In order for the implementation of lean philosophy in each of the above-mentioned areas to be effective, it is necessary to acquire management skills that are referred to as 'lean thinking'. Successful transformation towards Lean Manufacturing should concentrate on two areas in parallel. Next to building technical stability of processes, it is also necessary to develop an in-house culture at the following levels: production leaders (foremen, managers) and managerial staff. The idea is to create an organizational culture in which employees demonstrate initiative to solve problems and improve their work and in which everyone will co-operate in order to provide value to the client and contribute to the continuous improvement of processes. Lean Production will not be maintained in an organization without employees that are involved, trained and oriented on continuous improvement [Balle 2012]. The implementation of Lean Production may meet struggles with the individuals in enterprises, who have poor personal habits, feeling of personal insecurity and bad perception of other coworkers and on the other hand, it can be the resistance from the organization itself [Wyrwicka 2016]. Research prove that the factors that significantly determine the effective implementation of Lean Management principles are possession of a permanent and competent managerial and executive staff [Niewiadomski, Pawlak, Tsimayeu, 2018].

Managers should give the right example, and through appropriate management techniques, support the employees' behaviors focused on continuous improvement. In recent years and decades, the managerial staff has usually moved away from production and focused in increasingly specialized organizational divisions. Shopfloor Management reverses this trend and leads management again in the place of added value growth. The manager should take the roles of a committed teacher who has the ability to use 'common sense' judgment. The manager must be able to estimate what assistance the employee actually needs and authorize him if possible to solve problems independently. A characteristic feature of this concept is

learning the problem-solving methodology. The Genba Walk principle is applied here, which involves the necessity of approaching the site where the downtime occurs. The employee, being unable to solve the problem, asks the foreman to attend the workspace. If the supervisor (manager, superior, etc.) is not able to remedy the situation, a call to a higher manager is made, escalating the issue higher and higher up the organizational chart if required.

The main pillars of Lean Manufacturing philosophy in accordance with the above definitions are the economical use of resources, the constant elimination of all kinds of waste and the process of continuous improvement. Waste, in the dictionary of lean specialists, referred to in Japanese as muda, means carrying out works that consume resources, without adding any value to them. The muda includes, among others maintaining excessive stocks, overproduction, waiting, defective products or services, excessive processing, unnecessary movements in the production process and unnecessary transport [Rother, Shook 2009].

In addition to classic waste, contemporary literature mentions the untapped potential of employees and work without indicators as an additional two wastes. On the above grounds, a production department management tool called Shopfloor Management was built. The basics related to the universal methodology of managing current themes in the company have been presented in a book of a Japanese author Kiyoshi Suzaki 'The New Shop Floor Management'. This method puts the spatial organization of the production hall in the center of interest. The organization of flows in the workshop is to be an installation for the harmonious production of goods. Production should take place in the most effective, flexible and undisturbed way.

## **CONDITIONS FOR THE IMPLEMENTATION OF THE ELEMENTS OF LEAN PRODUCTION IN STEEL RBB**

STEEL RBB is a Polish company from the SME sector with 60 years of experience in the metal industry. The main business profile is the processing and distribution of steel products. The company has been certified by PN-EN ISO 9001: 2015 Quality Management System and Environmental Management System. Additional information about the history of the company and portfolio can be found on the website <https://steel-rbb.pl/pl/> and digital public relations channels. The company is managed by a director who manages three production departments: Production Preparation (DPP - 26 production workers), Mechanical Department (DPK - 34 employees) and Welding Department (DPS - 108 employees). Each department has its own production hall and office rooms for the manager, foremen and planners. All halls, warehouses, main office building and social buildings are located in one area.

The rapid development of the company from 2015 to 2018 brought problems in operational management at the production department. They mainly concerned delays in the execution of orders according to the production plan and late identification of faults. The laser cutting department focused on achieving its own goals and high quality of external customer service, at the expense of internal projects carried out in the company. To improve the functioning of the company, it was decided to divide it into three organizational sections responsible for: production preparation (lasers and saws), mechanical machining and welding (together with sandblasting, painting and packaging) respectively. However, this had not improved the flow of details and information between departments. There was no factor facilitating the integration of these three functional areas.

Analysis of the production situation by a team appointed by the Managing Director, including three managers, three production foremen and a consulting company showed that one should turn to management methods



derived from the philosophy of Lean Production. Reference visits to contractors and other companies with a corresponding profile that implemented Lean Manufacturing convinced the management that STEEL RBB should implement the SFM method.

Table 1 summarizes the main areas of activity that required improvement and the desired target effects that were expected to be achieved through the implementation of effective department management (coordination of the three production departments).

Table 1. Reasons for implementation SFM in STEEL RBB

Pre-implementation analysis		
Reported undesirable effects	Symptoms	Objectives
complaints about not meeting the deadline, problems with coordination of the flow of details between departments, late identification of faults, unreliable production data in the ERP system,	lowering the profitability of production accumulation or shortages in the storage areas, delays in processing orders, small number of internal complaints wrong plans and production routes	punctuality of shipments at the level of 95% improvement of production results after intervention and balanced flow of details through the production hall, early identification of faults getting dedicated access to information about a situation in the company and the ability to react within 24 hours, ensuring effective communication about production results, arising problems or expected decisions,

Source: own work

Conditions collected in table 1 showed that operational management was burdened with many errors in the area of work and information flow. The lack of a coordinated method of controlling and a transparent system of presenting outcomes resulted in delaying the execution of orders and dispelling responsibility for the occurrence of deficiencies. Expectations for the implemented system have shown the benefits of employing the SFM method. An additional goal was to raise the competence of production foremen to learn about modern control techniques, and thus became the leaders in the implementation of the concept of continuous improvement.

It should be noted that the implementation of SFM tools was not an isolated project. At the same time, the 5S concept, as well as elements of the Kaizen method were implemented for office and production positions of the company. At STEEL RBB, it was called 'a good idea' and involved setting up a team that assessed, rewarded and led to the implementation of the best improvements proposed by the employees and submitted through so-called 'good idea' boxes. All these

methods were introduced at the same time, and the aim was to support mutual improvement activities and gain synergy effects. Among other things, an SFM meeting discussed the level of incoming reports of 'good ideas', and during the review of the correctness of the SFM method, a 5S audit is also conducted at production sites.

## MAIN OBJECTIVES AND COMPONENTS OF SFM METHOD

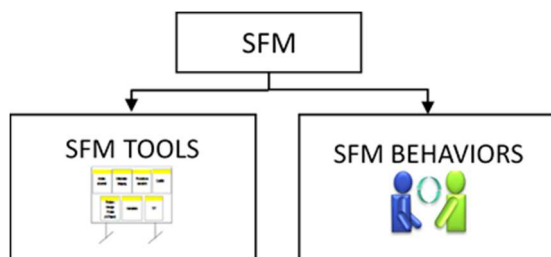
The main goal of Shopfloor Management is to work out the principles of verifying and presenting production results to merge the efforts and initiative of the production units with production supervision and together seek to eliminate errors and improve the efficiency of the process. According to the assumptions of the author of the method [Suzaki 2010], SFM should focus on real objects:

- Genba (real place) - SFM's preferred place is the production hall where the products are created,
- Genbutsu (real information) - true information on all problems encountered,

- Genjitsu (facts) - information should be based on objective and real facts, not on subjective judgment.

SFM task is to solve current problems by eliminating process errors, determining proper communication within the organization and through continuous improvement [Suzaki 2010]. SFM belongs to the methods of visual management. The most common form of SFM for production processes is the daily reporting of results from the previous day at the scoreboards. All problems that have arisen and caused the failure to keep the plan must be discussed. Then, it is necessary to implement corrective actions or escalation to a higher level if a complicated problem arises.

SFM is based on two pillars (Figure 1). The tools (technical elements of visual management with a system of procedures) and proper behaviors of leaders (employees focused on eliminating waste and errors) are needed.



Source: Suzaki 2010

Fig. 1. Elements of SFM

Table 2 contains the main components of individual SFM elements. The role of management is to determine what data and areas will be discussed at meetings, as well as to create a positive culture of information management and issues discussed during the SFM review.

Table 2. Elements of SFM

<b>SFM Tools:</b>	
-	production diary,
-	indicators (performance, absences, punctuality and shortages are presented in various graphical forms),
-	escalation criteria,
-	table of continuous improvement.
<b>SFM Behaviors - the role and characteristics of the leader:</b>	
-	leaders use the right questioning techniques,
-	do not blame employees,
-	summarize briefly,
-	form an objective picture of the situation,
-	actively listen to employees, give and receive feedback and recognize waste in processes

A production diary is a key tool determining the type, rank, and schedule of meetings within the SFM method. An exemplary excerpt of the agenda used in STEEL RBB is shown in Figure 2. It contains a meeting schedule and a list of people who should participate in them. There is also a list of employees who are invited for an optional review if necessary, e.g. technical director at a time when a failure is discovered. The general rule is to designate a replacement if one cannot participate. Table 3 contains a ranking description of the meetings. The link between the meetings is the escalation procedure, which determines what problems should be solved on the first level SFM and what should be left for consideration on the second level SFM.

SFM meetings prove highly efficient in transferring key information in the shortest possible time. The participants are required to be punctual and well-prepared for the discussion about deviations from the standard/pattern, as well as to comply with a moderator and giving feedback each time.

Table 3. SFM meetings hierarchy

<b>SFM meetings</b>	
0 degree	daily review of the department by the master of production, gathering information about downtime, breakdowns, failures or accidents
I degree	daily meetings in each department at the SFM table and discussing all tasks in accordance with the agenda
II degree	meeting of managers and directors of each department, once a week, setting tasks for 14 days, solving problems escalated from the first degree meeting

Time	Thursday	Who	Friday	Who	Level	Frequency
5:55-6:10 13:55-14:10 21:55-22:10	Shift inspection	Foreman/Worker	Shift inspection	Foreman/Worker	SFM - 0	Daily meetings (working Saturdays and Sundays too)
8:15-8:24	Shopfloor Meeting - laser cutting	Foreman, PP, DP, DL, MA, DT*, DJ*, DK*, DI*	Shopfloor Meeting - laser cutting	Foreman, PP, DP, DL, MA, DT*, DJ*, DK*, DI*	SFM - I	
8:24-8:29	Walk and see	Foreman, PP, DP, DL, MA, DT*, DJ*, DK*, DI*	Walk and see	Foreman, PP, DP, DL, MA, DT*, DJ*, DK*, DI*		
8:30-8:39	Shopfloor Meeting - machining	Foreman, PK, DP, DL, DT*, DJ*, DK*, DI*	Shopfloor Meeting - machining	Foreman, PK, DP, DL, DT*, DJ*, DK*, DI*		
8:39-8:44	Walk and see	Foreman, PK, DP, DL, DT*, DJ*, DK*, DI*	Walk and see	Foreman, PK, DP, DL, DT*, DJ*, DK*, DI*		
8:45-8:54	Shopfloor Meeting - welding	Foremen, PS, DP, DL, DT*, DJ*, DK*, DI*	Shopfloor Meeting - welding	Foremen, PS, DP, DL, DT*, DJ*, DK*, DI*		
8:54-8:59	Walk and see	Foremen, PS, DP, DL, DT*, DJ*, DK*, DI*	Walk and see	Foremen, PS, DP, DL, DT*, DJ*, DK*, DI*		
9:00-9:30	Production meeting	DP, D, PP, PK, PS, DH, DZ, DK, DL			SFM - II	Weekly meetings
12:00-12:20	Weekly meeting with General Manager	D, DZ	Weekly meeting with General Manager	D, DK		
12:30-13:30			'Good idea' meeting	D, DJ, DT		
D - General Manager		DP - Planning Manager		DL - Logistics Specialist		DK - Designer
PP - Production Preparation Chief		MA - Warehouse Master		DT - Technical Manager		DI - IT Specialist
PK - Machining Department Chief		DJ - Quality Manager		DZ - Purchase Manager		
PS - Welding Department Chief		DH - Key Account Manager		* - presence on request		

Source: own work based on implementation in STEEL RBB

Fig. 2. Production diary – excerpt

This distribution of meetings allows the moderator (master, leader, director) to efficiently discuss the results and hear reports from a group of 8-15 people in about 30 minutes. Each meeting is equally important and determines the possibility of holding a higher-level meeting. Summits form a coherent stream of information and decisions in both directions. The principles of cooperation are defined in the production diary.

An example of the first degree SFM board at the machining department at STEEL RBB is shown in Figure 3. According to the agenda posted on the board, the following areas and data are discussed:

- safety (safety cross - whether accidents or potentially dangerous events occurred) - area A,
- absence of employees (checking if the absenteeism rate is within the assumed range) - area B,

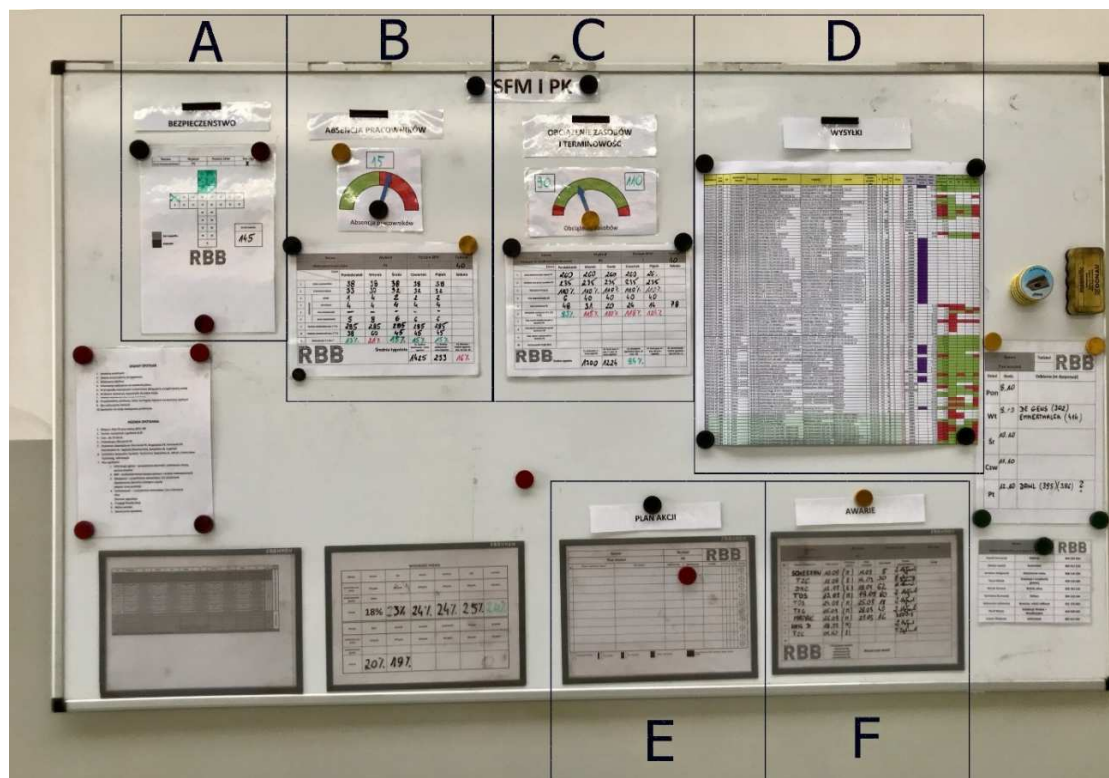
- resource usage and timeliness (ratio of the planned amount of hours to available resources) - area C,
- shipment (progress of individual orders and discussion of critical threats of deadlines - attention is focused on discussions about problems that have occurred in production and could potentially lead to failure to achieve the goal, the actions taken and their status) - area D,
- action plans (tasks to be completed in more than 24 hours, planned by the PDCA principle, progress checked daily) - area E,
- failures (an overview of the progress of repairs broken machines and devices) - area F.

The above-mentioned elements described in the table constitute a permanent agenda for each meeting and require each time to be discussed. The review of SFM ends with a discussion of problems that the master of production was unable to solve by himself during the inspection of the department and the collection of data. This is done in accordance

with the ‘Gemba Walk - go, see and react’ principle. It involves direct assessment of the situation by the manager in the place where the problem occurred. Thanks to this, he gains an opinion about the situation and supports the team in solving the problem.

However, the system of tables and indicators alone will not optimize any area of the enterprise without changing the attitude of employees, their way of thinking and acting, and promoting active and continuous involvement in the improvement of the enterprise [Nowosielski 2015]. It is advisable to choose leaders who have a good reputation, decision-making power, information, expertise, and interpersonal relationships to ensure a smooth change [Yang, Yu 2010]. Manager’s role in lean implementation is the main factor of success and emphasize the necessity of developing lean knowledge. Root-cause of lean success may be simply leadership knowledge and therefore specifically the attitude and commitment of leadership to learning. The enlarged understanding became the wisdom for

successfully implementing change. The organizational challenges necessitated particular skillfulness in the application of organizational leadership as well as the lean techniques. This includes how to form the vision for change and present that to others, educating them and motivating them to take steps towards its goal [Pearce, Pons, Neitzert 2018]. Therefore, it is crucial to develop a pattern of desired behaviors, especially for foremen and production managers. As in the case of SFM tools (data, indicators, procedures), and in the case of shaping the proper SFM behaviors, the greatest responsibility lies with the managers. The company’s management is obliged to personally become involved in the implementation of the lean idea. The master learns good practice from the manager and then passes it on to the employee. Desirable characteristics of direct production supervisors and leaders are included in table 2. Training of staff should be carried out according to the principle of continuous improvement.



Source: own study

Fig. 3. Appearance and components of the SFM table



It should be noted that the implementation of a system that redefines the structure and management of the production department causes a natural objection of part of the crew and does not always gain full management approval. Employees see additional control measures and unnecessary bureaucracy in SFM methods [Peters 2009]. On the other hand, managers perceive them solely as operational tools of visual operational control. The SFM method has a much wider range and long-term measurable effects that improve the functioning of the entire production department.

One year after the implementation of SFM in the company, it can be determined that the main expectations assumed have been met. The measurable effect is an increase in the company's turnover by 14% compared to the previous year. Higher timeliness of shipments for the main customer (up to 92%) contributed to the receipt of new orders for more advanced and profitable details (smaller share of welding and a larger of machining). Besides, lowering the rate of complaints regarding untimely deliveries, improving the efficiency of work and more than a dozen implemented projects submitted under the 'good idea' program. In the analyzed period, no investment projects were carried out, meaning that the increase in turnover was related to improving the organization of production and increasing the efficiency of the work of the staff. Positive changes occurred in the area of quality assurance. There was a decrease (by 3% compared to the previous year) of registered complaints from external customers. At the same time, the Quality Department monitored the continuous increase in internal claims. This shows that the effectiveness of error detection has been improved, and thus the costs of complaints are reduced. There has been a break in the growing trend of the share of defective products in relation to the volume of production. Since the implementation of the SFM method, the failure rate has decreased from 2.1% to 1.2%.

Taking into account the expectations specified before the introduction of the method, the remaining positive effects include:

- improving the flow of information, goods and obtaining easy transparent monitoring of results (incorrect or disturbing data are immediately identified),
- the possibility of reacting to any undesirable or contentious event by the next morning at the latest,
- increased operational efficiency due to management standardization,
- the ability to quickly make decisions and resolve disputes,
- limiting the occurrence of errors at work,
- stimulating the bottom-up initiative of employees under the 'good idea' program,
- positive impact on the company's income.

The success of implementation should be considered as a synergy effect of several components. At the same time, the 5S rules were implemented in all production departments and offices. Also, instruments and measures were prepared according to the Poka-Yoke tools to eliminate the possibility of making mistakes at the production sites. But all of them belong to Lean Production techniques and often play a supportive role.

However, the implementation was not without undesirable events. Especially in the initial period, there were many negative emotions among production workers. They perceived change as introducing strange-sounding practices that did not match the Polish reality of work. In the first contact they treated SFM as a form of controlling and verifying the work done and pointing mistakes. At this point, the management failed to prepare the right attitude of the organization. The manager's role in Lean is to be supportive and challenge the people they manage to develop this philosophy. It results from the fact that the constant transformation of the company is not possible without respect for people. It seems common in practice that the "respect for people" principle is misunderstood or neglected, which is often called an obstacle to Lean [Mrugalska, Ahram 2016]. The analysis of theoretical and empirical research on lean implementation allowed including negative staff attitudes, resistance to change, poor communication, lack of management support, and commitment to main inhibitors in lean implementation [Wyrwicka 2016].

Another problem for the implementation team was the initiation of the project from the Welding Department, which was the last one in the production chain and which was responsible for preparing shipments to the customer. The pre-implementation analysis showed that the department was the one most affected by incompatibility and timing issues. It turned out, however, that these were errors inherited from previous links in the production process. Only improvements in the area of production preparation (laser and cutting) became the flywheel of positive changes in the whole enterprise.

## CONCLUSIONS

It should be noted that SFM as a component of the Lean Production philosophy is the basis for continuous improvement. The auditing system helps to control the correctness of SFM meetings and correct inconsistencies on an ongoing basis. The 'good idea' program introduced during the implementation of SFM (boxes for submission of improvement forms by the employees) stimulated the bottom-up initiative and creativity of the entire crew. In 2019, actions were initiated to change the analog boards to digital interactive displays that will present the results of the ERP system in real-time.

Like any empirical study, this research has limitations. By being based on a single case, it is not possible to generalize results, and the external validity is small. However, it was found relatively strong evidence that the Lean Production implementation had positive impacts on the operational performance of the company. It is noticeable that the level of integration of lean tools in SMEs is quite low [Alkhoraif, Rashid, McLaughlin 2019] and that even knowledge of it is poor also [Achanga, Shehab, Roy, Nelder 2006]. There are many reasons for this have been identified. Although there have been studies based on the general implementation of Lean Production the majority of the research has concentrated on large enterprises and has omitted SMEs. This discrepancy is significant and deserves rectification. Most of Lean research up until now has focused on the Western countries and have largely ignored developing countries such

as Middle-East Europe and Asia. Suitable aspects of research based on this could include comparative case studies of SMEs implementing Lean Production in developed versus developing countries to determine the application of lean tools in SMEs in developing economies. [Alkhoraif, Rashid, McLaughlin 2019].

This paper contributes to showing how full, isolated implementation of one of the Lean Production methods allows to break long-term trends and improve the production process in SME company. The analysis of the results concerned turnover, deficiency indicator and implementation of continuous improvement. The additional advantage is identifying the importance of the leadership in the success of lean endeavors and showing how improving control of production and visualization of results is critical, and especially so in resource-constrained organizations, like SMEs. References to similar research results confirm the key role of shaping the right behaviors and attitude of managers to Lean Production. If leaders do not truly understand how to gain the benefits of Lean and an existing operational culture that opposed lean principles is not changed implementation cannot achieve total success. Another advantage of the article is its adaptive value. The described enterprise is one of several SME suppliers of components for the automotive industry and household appliances located in Poland. Most of these companies have evolved from small businesses created during the economic boom of the early 21st century, and many of them still do not use modern workshop control tools based on lean philosophy. Obtained information and conclusions may be valuable for them. For SMEs implementing Lean, on the positive side, they typically have a flat structure and simple systems, which promote flexibility to change and dissemination of knowledge. On the negative side, there are limited resources, including capital and staff capabilities. A typical SME may have only a few key employees and as their skills develop staff retention can be problematic.

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## SHOPFLOOR MANAGEMENT (SFM) JAKO NARZĘDZIE USPRAWNIAJĄCE STEROWANIE PRODUKCJĄ I WIZUALIZACJĘ WYNIKÓW

**STRESZCZENIE. Wstęp:** Ze względu na stosunkowo małą liczbę prac naukowych dotyczących implementacji narzędzi szczupłego zarządzania w małych i średnich przedsiębiorstwach (MŚP) niniejszy artykuł prezentuje obserwacje i analizę otrzymanych wyników, które mogą stanowić podstawę do implementacji metody Shopfloor Management (SFM) jako narzędzia ułatwiającego zarówno operacyjną kontrolę produkcji, jak i wizualne zarządzanie wynikami w firmach z sektora MŚP.

**Metody:** Badania zostały przeprowadzone dwutorowo: w oparciu o analizę porównawczą, bazującą na studium literatury źródłowej i obserwacje efektów zastosowania metody SFM w wybranym przedsiębiorstwie z sektora MŚP.

**Wyniki:** Stwierdzono korzyści uzyskane w efekcie wdrożenia metody SFM w postaci uproszczenia rozwiązań organizacyjnych, zastosowania zarządzania wizualnego i kształtowania pożądanych kompetencji liderów.

**Wnioski:** Prezentowane badanie pokazuje, że skoordynowane i konsekwentne wdrażanie elementów Lean w przedsiębiorstwie należącym do kategorii MŚP, które wcześniej nie korzystało z żadnych narzędzi tej koncepcji, może dać wyraźną poprawę w zakresie wzrostu obrotów, wczesnego wykrywania i eliminacji braków, a także jako zmiana nastawienia całej załogi w kierunku ciągłego doskonalenia. Pozytywne skutki wdrożenia Lean, w oparciu o metodę SFM zostały potwierdzone empirycznie.

**Słowa kluczowe:** efekty wdrożenia Lean, zarządzanie produkcją, Lean Production, Shopfloor Management

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Maciej Ciszewski ORCID ID: <https://orcid.org/0000-0002-9963-6759>  
Poznan University of Technology  
Faculty of Engineering Management  
ul. Strzelecka 11, 60-965 Poznan, **Poland**  
e-mail: [maciej.j.ciszewski@doctorate.put.poznan.pl](mailto:maciej.j.ciszewski@doctorate.put.poznan.pl)

Magdalena K. Wyrwicka ORCID ID: <https://orcid.org/0000-0002-9513-7354>  
Poznan University of Technology  
Faculty of Engineering Management  
ul. Strzelecka 11, 60-965 Poznan, **Poland**  
e-mail: [magdalena.wyrwicka@put.poznan.pl](mailto:magdalena.wyrwicka@put.poznan.pl)