

## 5S Method as a Set of Measures To Improve Quality of Production In The Organization

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**Abstract:** *The result of this work was the application of the method 5S as a set of measures to improve the quality in the organization. The organization evaluated properly with all the steps 5S method, i.e. separation, systematization, still cleaning, standardization and self-discipline. Correct application method can be appear the positive results, such as improvement of manufacturing processes, clarity, cleanliness in the workplace, elimination of waste, improve the culture of the organization, and so on. In the area of occupational safety and health 5S method takes an important role. Form of clarity, orderliness, standardized procedures and self-discipline reduce accidents at work.*

**Keywords:** *quality, 5S method, management, process improvement*

### INTRODUCTION

The 5S method presents simple concept and it is easy to understand for organization, it does not require complex terminology. 5S method used natural human behavior and logic and is available for all types and sizes of organization.

In recent years become quality management a strategic issue in top management of all organization that is customer oriented [29,25]. These features 5S method is used as a platform parallel use of total productive maintenance (TPM). [15] A common definition of 5S is „housekeeping” [2,6,7,8,9], which is improperly understood definition. The Toyota Production System provides a well-known example of 5S principles in practice [22]. The 5S forms a kind of foundation which can be built further improvements. The success of 5S can be no doubt. An example would be it is enormous popularity in Japan (Toyota) and it is implementation in world organization (Boeing; Hewlett-Packard; Siemens; Harley-Davidson New York; Inc.) and in Slovakia (Visteon Interiors Slovakia, s.r.o., Nitra; Matador Automotive Vráble, a.s., Vráble...) [24,4].

#### A review of the literature

The understanding 5S is detailed and engrained in Japan, as it stems from an approach that sees it as life wisdom, practiced everyday [9]. Within Japan it is endeavoured that the practice of 5S be integrated with another Japanese life wisdom kaizen (change for the better) and me-de-miru (visual) methods [15]. The development of 5S from this initial starting point to the current comprehensive framework was first formalized by Takasi Osada in the early 1980s. While the traditional Japanese understanding of 5S follows the five-steps model there is some difference within some Japanese organizations in the elements used for 5S. Some Japanese organizations adopt 3S [21] whereas others implement 6S [27,28]. In order that organization to show the best results, it is necessary that the individual departments communicate with each other and work together. This identifies the risk and eliminates negative effects [18, 19].

The 5S is a name abbreviations five Japanese words which is hidden principle involved [16,17]:

- Seiri (Tidiness) – separate things which is necessary for the performance, from unnecessary and maintaining the necessary things for a suitable job,
- Seiton (Orderliness) – systematization solving orderliness. The principle is to decide how to assigned things, how to quickly things need to be obtained and how to quickly they can be postponed again,
- Seiro (Cleanliness) – observance of cleanliness in the workplace and in your mind as well as in your surroundings. These are the habits that should also adopt and reflect in the organization. Cleanliness should keep everyone starting management ending cleaner.

- Seiketsu (Standardization) – this principle speaks of continual and repeated maintenance organization in orderliness and cleanliness,
- Shitsuke (Discipline) – this principle speaks of cultivating a sense of order, workplace and the organization.

Authors [1] suggest that 5S and TPM can be practiced not only simultaneously but also in conjunction with other process improvement methods used in total quality management (TQM), kaizen and just in time (JIT) methods so that organizations can take an integrated approach. This view is empirically supported by authors [17] who identified that there are benchmarking standards (figure 1). In practice, enormous effort may be required to achieve this integrated management system. Therefore small-to-medium organizations may resist taking this view due to economy of scale. Researchers recommend considering 5S in a more philosophical or at least strategic way.

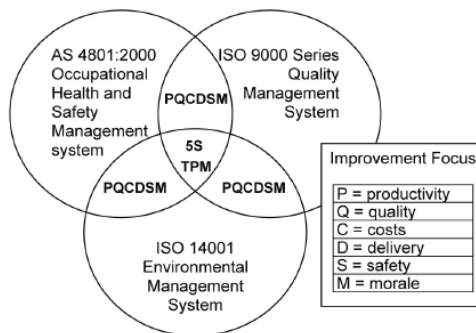


Figure 1 Conception of use 5S [29]

Every organization may use a simple project 5S to eliminate the problems of waste that give immediate positive results. 5S is the first step towards Total Quality Management (TQM) and Business Excellence (BE). The organization may thus provide a competitive advantage because the competition and the factors, such as zero defects, timely delivery, price and customer adaptation, since 1970 been increasing [26]. Within a system of lean production the 5S aims to add value to the tidiness, cleanliness, orderliness, standardization and discipline in the real operation. Usually this is the first method of lean production implemented by organization [11]. 5S is a prerequisite for the introduction of many other methodologies which have evolved during the past four decades such as TPM, JIT, EFQM, KAIZEN, QC, BPR, WCM, EM, etc. [3,5,10,13,14]. Some of these are today regarded as world-class manufacturing strategies. However, they failed to achieve the desired goals when they were applied together. This is due of incompatibilities among them. This deficiency is overcome since researchers have established that 5S is capable of interweaving several world-class manufacturing strategies along with system standards of ISO. This aspect simply depicted figure 2.

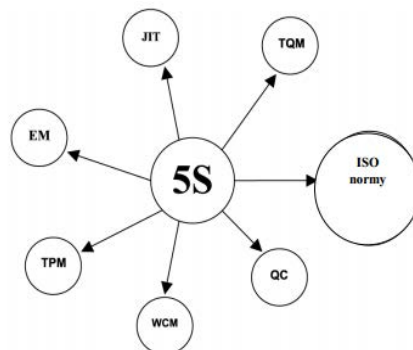


Figure 2 Links of 5S with other strategies and standards ISO [20]

## MATERIALS AND METHODS

The goal of 5S method as a set of measures to improve the quality of the organization is to create, maintain and continuously improve safety, order and cleanliness in the manufacturing organization in the automotive industry. The 5S process covers all areas: manufacturing and non-manufacturing, office, maintenance and logistics.

5S auditing achieves these benefits:

- place saving,
- time saving: finding objectives, removing unnecessary movements,
- a overview of available objects and material,
- safer workplace,
- non-use unhealthy objects and nonconforming parts,
- no intervening material.

## RESULTS

The first step was divided employees on the basis of their responsibility. From among the employees were authorized persons who are within the 5S responsible for three individual sections of the organization. Responsibilities of employee particular sections are shown in figure 3.

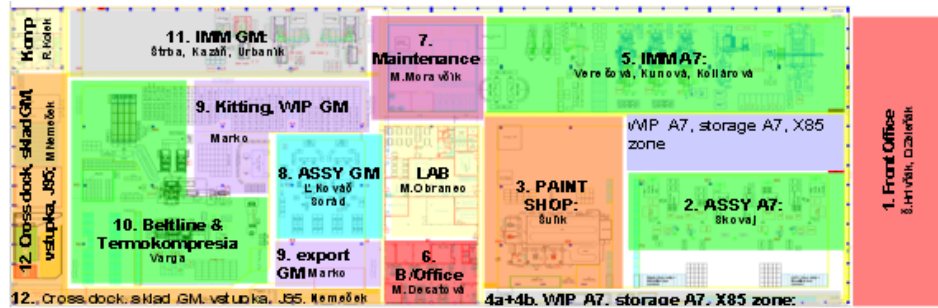


Figure 3 Division of employee competencies at the particular sections of the organization

Workplace was visually evaluated according to the sections. Practice sample is shown on figure 3 and responsibility for a department using the 5S method in the production organization. Example of the practical implementation of 5S method is shown in figure 4.

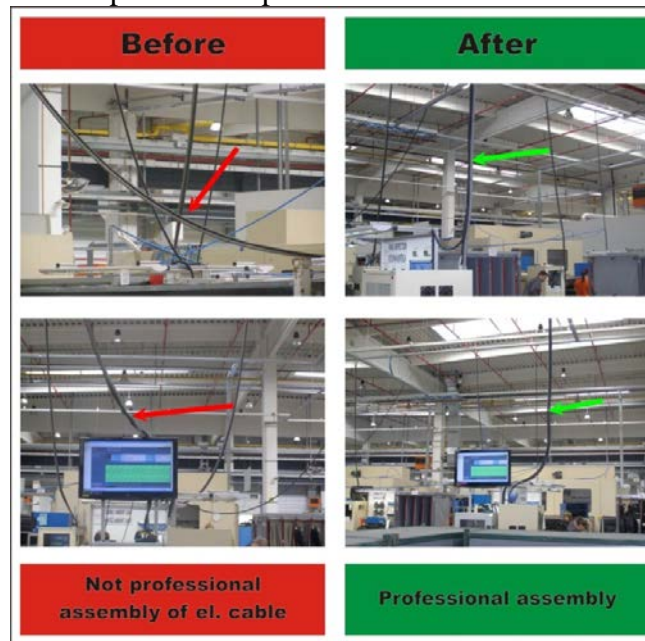


Figure 4 Practical implementation of visual evaluation of workplace

Visual evaluation worked out audit forms for particular sections and functional units. Example Seito – there are two issues to individual categories are awarded points accordingly. If the answer to both questions is in the affirmative categories, shall be assigned 2 points. If it is positive for only one of them shall be assigned 1 point and if the answer is no positive even when one question shall be assigned 0 points.

Presentation of the results of 5S audits were presented at the meeting of the audit group. The results are placed on the board in the main meeting rooms which proposes to improve the existing situation.

## SUMMARY

The 5S is a group of techniques, methods and sequences which are aimed at the organization of the workplace, the observance of rules and standards and incessant improvements. Complex 5S creates a continuous process of improving of the work environment. For achieving continues process improvement it is necessary to emphasize on creating optimal working conditions at the workplace. 5S method is an appropriate tool to realize this goal. There activities are inexpensive and depend on the access and the ability of employees. We can conclude that 5S method is a universal system for other control systems applied in the organization, no matter whether or not the organization introduced a different system.

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## REFERENCES

- [1] BAMBER, C. J., SHARP, J. M., HIDES, M. T. (2000), Developing management systems towards integrated manufacturing: a case study perspective, *Integrated Manufacturing Systems*, Vol. 11 No. 7, pp. 454-61.
- [2] BECKER, J. E. (2001), Implementing 5S to promote safety and housekeeping, *Professional Safety*, Vol. 64 No. 8, pp. 29-31.
- [3] BUJNA, Marián - PRÍSTAVKA, Miroslav - BURDA, Marek - ŽITŇÁK, Miroslav. FMECA Method Analysis. In *Acta technologica agriculturae*. ISSN 1335-2555, 2012, roč. 15, č. 2, s. 29-32. Dostupné na internete: <<http://www.fem.uniag.sk/acta/download.php?id=1155>>.
- [4] BUJNA, Marián - PRÍSTAVKA, Miroslav - KAPLÍK, Pavol. Impact of insufficient cleaning on the quality of molybdenum layer applied by thermal spraying. In *Advanced Materials Research*. ISSN 1022-6680, 2013, vol. 801, special iss., p. 35-40.
- [5] BUJNA, Marián - PRÍSTAVKA, Miroslav. Analýza ohrozenia metódou FMEA. In *Kvalita a spoľahlivosť technických systémov*. 1. vyd. 309 s. ISBN 978-80-552-0798-8. Slovenská poľnohospodárska univerzita (Nitra, Slovensko. Nitra : Slovenská poľnohospodárska univerzita, 2012, s. 36-40.
- [6] CHIN, K. S., PUN, K. F. (2002), A proposed framework for implementing TQM in Chinese organizations, *The International Journal of Quality & Reliability Management*, Vol. 19 Nos 2/3, p. 272.
- [7] COONEY, R. (2002), Is 'lean' a universal production system? Batch production in the automotive industry, *International Journal of Operations & Production Management*, Vol. 22 No. 10, pp. 1130-47.
- [8] da SILVEIRA, G. J. C. (2006), Effects of simplicity and discipline on operational flexibility: an empirical reexamination of the rigid flexibility model, *Journal of Operations Management*, Vol. 24 No. 6, pp. 932-47.

- [9] ECKHARDT, B. (2001), The 5-S housekeeping program aids production, Concrete products, Vol. 104 No. 11, p. 56.
- [10] FÖLDEŠIOVÁ, Daniela - BUJNA, Marián. Analýza rizika metódou FMEA. In Najnovšie trendy v poľnohospodárstve, v strojárstve a v odpadovom hospodárstve 1 CD-ROM (249). ISBN 978-80-552-0781-0. Najnovšie trendy v poľnohospodárstve, v strojárstve a v odpadovom hospodárstve. Nitra : Slovenská poľnohospodárska univerzita 2012, s. 67-72.
- [11] GAPP, R., FISHER, R., KOBAYASHI, K. (2008), Implementing 5S within a Japanese context: an integrated management system, Management Decision, Vol. 46 No. 4, pp. 565-579.
- [12] HRUBEC, J. – VIRČÍKOVÁ, E. a kol. 2009. Integrovaný manažérsky systém. 1. vyd. Nitra : SPU, 2009. 543 s. ISBN 978-80-552-0231-0
- [13] HRAŠKOVÁ, Zuzana - BUJNA, Marián. Posúdenie bezpečnosti pri zavádzaní inovácií do výroby. In Najnovšie trendy v poľnohospodárstve, v strojárstve a v odpadovom hospodárstve. 1. vyd. 1 CD-ROM (362 s.). ISBN 978-80-552-1014-8. Najnovšie trendy v poľnohospodárstve, v strojárstve a v odpadovom hospodárstve. Nitra : Slovenská poľnohospodárska univerzita, 2013, s. 137-142, 1 CD-ROM.
- [14] KAPLÍK, Pavol - PRÍSTAVKA, Miroslav - BUJNA, Marián - VIDERNĀN, Ján. Use of 8D method to solve problems. In Advanced Materials Research. ISSN 1022-6680, 2013, vol. 801, special iss., p. 95-101.
- [15] KODAMA, R. (1959), Medemiru Kaizen dokuhon, Nikkan Kogyo Shinbunsha, Tokyo.
- [16] KORENKOVÁ, M. 2008. Podnikanie a manažment. 1. vyd. Nitra : UKF, 2008. 122 s. ISBN 978-80-8094-404-9
- [17] KORENKOVÁ, M. 2014. Základy manažmentu. 1. vyd. Nitra : UKF, 2014. 139 s. ISBN 978-80-558-0582-5
- [18] KREDATUSOVÁ, M., BUJNA, M. (2010), Identifikácia a analýza ohrozenia vo vybranom procese. Identification and analysis of hazard in the selected proces. In Najnovšie trendy v poľnohospodárstve, v strojárstve a odpadovom hospodárstve : medzinárodná študentská vedecká konferencia, Nitra 28. 4. - 29. 4. 2010 = Recent advances in agriculture, mechanical engineering and waste policy : international student scientific conference. Nitra : Slovenská poľnohospodárska univerzita v Nitre, 2010. ISBN 978-80-552-0376-8. , s. 146-152. Dostupné na internete: <<http://www.slpk.sk/eldo/2010/zborniky/026-10/kredatusova.pdf>>.
- [19] KREDATUSOVÁ, Mária - BUJNA, Marián. Identifikácia a analýza ohrozenia vo vybranom procese. Identification and analysis of hazard in the selected proces. In Najnovšie trendy v poľnohospodárstve, v strojárstve a odpadovom hospodárstve : medzinárodná študentská vedecká konferencia, Nitra 28. 4. - 29. 4. 2010 = Recent advances in agriculture, mechanical engineering and waste policy : international student scientific conference. Nitra : Slovenská poľnohospodárska univerzita v Nitre, 2010. ISBN 978-80-552-0376-8. , s. 146-152. Dostupné na internete: <<http://www.slpk.sk/eldo/2010/zborniky/026-10/kredatusova.pdf>>.
- [20] KUMAR, R. S. P., SUDHAHAR, C., DICKSON, J. F. (2007), Performance analysis of 5-S teams using quality circle financial accounting system, The TQM Magazine, Vol. 19 No. 5, pp. 483-496.
- [21] NAKAMURA, H. (1992), Restructuring operations through the MAF production improvement system, Integrated Manufacturing Systems, Vol. 3 No. 1, pp. 13-17.
- [22] OHNO, T. (1988), in Dillon, A. P. (Ed.), Workplace Management, Productivity Press, Cambridge, MA.
- [23] OSADA, T. (1989), 5S – Tezukuri no manajiment semhō (5S – Handmade Management Method), JIPM, Tokyo

- [24] PRÍSTAVKA, Miroslav - BUJNA, Marián. Use of statistical methods in quality control. In *Acta technologica agriculturae*. ISSN 1335-2555, 2013, vol. 16, no. 2, s. 33-36. Dostupné na internete: <<http://www.degruyter.com/view/j/ata.2013.16.issue-2/ata-2013-0009/ata-2013-0009.xml?format=INT>>.
- [25] SAVOV, R., DŽUPINA, M., Strategický manažment kvality v podmienkach podnikateľského subjektu na Slovensku. In: *Znalostní ekonomika, trendy rozvoje a vzdělávání, vědy a praxe*. Zlín: UTB, 2007. ISBN 978-80-7318-646-3
- [26] SHIL, N. CH. (2009), Explicating 5S: Make you Productive, *Interdisciplinary Journal of Contemporary Research In Business*, Vol. 1 No. 6, pp. 33-47.
- [27] SPRAGUE, J. (2002), China's manufacturing beachhead, *Fortune*, Vol. 146, pp. 192-6.
- [28] ZELINSKI, P. C. (2005), If 5S is good, try 13S Next, *Modern Machine Shop*, Vol. 77 No. 9, p. 12.
- [29] ZUTSHI, A., SOHAL, A. S. (2005), Integrated management system: the experiences of three Australian organizations, *Journal of Manufacturing Technology Management*, Vol. 16 No. 2, p. 211.

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