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Visual management in two Brazilian companies: a case study

Gestión de visual en dos empresas Brasileñas: un estudio de caso

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Palabras Clave: gestión visual, empresas Brasileñas, fabricación
Key Words: visual management, Brazilian companies, manufacture

RESUMEN

Un sistema de gestión visual puede contribuir a optimizar procesos y reducir las pérdidas en ambientes productivos. Así, el propósito de este trabajo es comprender cómo los dispositivos visuales se introducen en el entorno de producción en dos empresas de fabricación brasileña, identificando sus funciones y usos, así como las pérdidas potenciales resultantes de los procesos de producción. La metodología fue exploratoria de carácter cualitativo, con entrevistas en profundidad con dos profesionales por empresa. Posteriormente, se realizó un análisis de las respuestas, lo que permite la comparación de estos datos con la investigación teórica. Con esto estudio de caso fue posible realizar cómo se utilizaron los dispositivos visuales en la producción en dos empresas brasileñas de fabricación. Además, se identificó, a través de sus funciones y usos, las posibles pérdidas derivadas de la falta de disponibilidad de información y la falta de controles de seguridad y discontinuidades.

ABSTRACT

A visual management system can contribute to optimize processes and to reduce losses in productive environments. Therefore, the purpose of this paper is to understand how visual devices are entered in a production environment in two Brazilian manufacturing companies, identifying their functions and uses, as well as potential losses resulting from production processes. The methodology was exploratory of qualitative nature, by in-depth interviews with two professionals by company. Subsequently, a responses analysis was made, allowing comparison of these data with theoretical research. Throughout this case study, it was possible to realize how visual devices were used and inserted in production environment, in two Brazilian manufacturing companies. Furthermore, it was identified, through its functions and uses, the possible losses arising from information unavailability and a lack of security controls and discontinuities.

INTRODUTION

Visual devices are used in production environments with the purpose of sharing information, and reduce possible losses and errors in processes and operations. According to Koskela (1992), these visual devices are one of the most known and simple ways to deploy communication between processes occurrences and people through clear and available information. The group of these visual devices, intentionally designed to share information linking the need for an activity with the necessity for their realization (Galsworth, 1997), form a visual system, as can be seen in figure 01.

Through visual system management, visual controls comprise one of the Toyota production principles. Regarding this principle, Liker (2005) emphasizes the use and applications of visual controls in order to prevent a problem is hidden. According to the author, devices or visual controls are directly related to the concept of just in time. The author further points out that these visual controls interconnected to the creation of just in time information, and ensuring the proper and quick execution of processes and operations and thus improving their flow. Lean manufacturing use visual management concepts into processes to influence human behavior, present rules and measures visually, control inventory, improve safety, organize spaces, present the organizational goals and strategies, reduce the displacement and waiting as well as manage human resources (Tezel; Koskela; Tzortzopoulos, 2008).

The Visual Management can be defined as a management system that seeks to improve organizational performance through the connection and alignment of vision, values, goals and organizational culture with other management systems, work processes, work environment elements and people participating through stimuli that are directly connected to one or more of the five senses (sight, hearing, touch, smell and taste) (Liiff; Posey, 2004). Greif adds that information management should be strategic enough that those involved in production processes can make use of accurate knowledge in a structured manner and at the time it becomes necessary (Greif, 1991). Among the main advantages offered by Visual Management, set the best exposure of necessary information and ease of assimilation of this information in the workplace (Mestre et al, 1999). Visual management helps to improve one of the central themes of new production management model: the search for solutions that make processes more easily observable, clean, organized and easier to perform control and improvement (Martins, 2006).

Note that visual management has been a recurring theme of international studies (Tezel; Koskela; Tzortzopoulos,, 2008; Aik, 2005; Mestre et al, 1999) and, increasingly perceived as a principle determinant for achieving excellence in operations and production processes. However, in Brazil, the research on the subject in question is still underexplored. A systematic literature review was developed by Libânio et al. (2012) with the objective of mapping the Brazilian academic production. This research found 23 papers, theses and dissertations among Brazilian dealing partly or in whole theme about visual management. These works were published in 1996 and had an increase in the volume of publications in 2004 and 2009. From this study, the authors show that, increasingly, the visual management is perceived as a strategic practice in companies, and related terms such as lean manufacturing, just in time, Kaizen, performance measures and the Toyota Production System and devices visual.

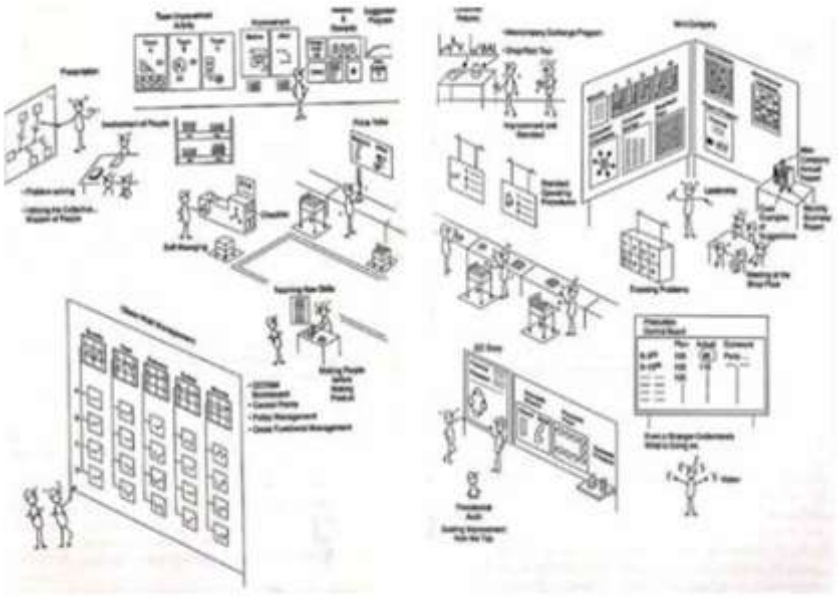

Figure 1: Overview of productive environment and examples of visual devices. Source: Suzaki, 1993

In search of better outcomes, organizations have adopted lean principles and practices in order to create value for customers with lower costs, improve processes through the involvement of people qualified, motivated and with initiative. Therefore, the purpose of this paper is understand how visual devices are entered in production environment in two Brazilian manufacturing

companies, identifying their functions and uses, as well as potential losses resulting from production processes.

METHODOLOGY

For this research, it was used exploratory methodology of qualitative nature, with in-depth interviews (Malhotra, 2012). Malhotra (2012) highlights that qualitative research is a research methodology unstructured, exploratory, based on a small sample, enabling the understanding of the problem. With regard to the case study, Gil (1999) states that is characterized by a deep and detailed study of one or more objects in a way that enables a comprehensive knowledge and thorough. Yin (2005) also points out that the case study is used as a research strategy when questions like 'how' and 'why' are placed, when the researcher has no control over events and when the focus of research is on contemporary phenomena.

It was drawn from a semi-structured questionnaire which the interviewer had no obligation to follow in full. Interviews were conducted with two officials linked to the productive area by each of the two companies, among them: an industrial manager and a machine operator. Data were collected through primary sources being used a direct approach. The interviews were used in the research in order to collect qualitative data and were conducted in person. One respondent was tested at a time by the interviewer, aiming to discover information about the subject matter. In the stage of data analysis, it was developed a content analysis (Bardin, 2005), aiming at achieve the objectives of this research. The companies interviewed are identified as Company A and Company B to maintain the secrecy required by both.

The company A is medium size, operates in the print media and is located in the southern region of Brazil. With 11 years of existence, the company's business is newspaper publishing and it reaches the vast majority of cities in southern Brazil. Company B is considered large, has 62 years of existence, has the quality certification ISO 9001 and its business is producing generator sets to Brazil and abroad. Both companies are leaders in their industries and develop projects aimed at optimizing its production processes and reducing losses and rework.

The theoretical research enabled the development of analyzes and comparisons between theory and market reality about the activities of production management, production processes and visual management. Thus, it was possible to analyze the activity and the production process, trying to understand how visual devices were inserted into the production environment, identifying their functions and uses, as well as potential losses resulting from these processes.

RESULTS AND DISCUSSION

The proposed study of visual devices in visual management stems from the analysis of the productive environment of two Brazilian manufacturing industry companies. The aspects analyzed were organized and classified into four major groups: partners and coworkers involved in the production process; production process steps; visual devices identified in the production environment; losses in the use or non-use of these visual devices. These groups were further divided into items deemed relevant for analysis as follows.

Partners and coworkers involved in the production process

According to the respondents of Company A, the sectors involved in the drafting of the final product are: writing, responsible for gathering information and preparing the paper's editorial; the commercial sector, which collects and develops customer ads; the industrial department, which brings together

the work performed by writing and ads developed by completing a graphic piece of visual production (the newspaper); the productive sector, responsible for the production of parts; and an agent who is called outsourced remittance, responsible for the distribution of newspapers to retail outlets and consumers. The productive sector is supervised by a manager and is composed of industrial subsectors, such as image, maintenance, closing page, prepress, and production itself. The picture and maintenance subsectors have specific managers, subordinate to the industrial manager. Operators who work in specialized functions that make up the production process are distributed along the production line and subsectors.

The industrial manager of company A also highlights that there is a sharing of information made by the sector of information integration. The information generated by this sector help in making decisions related to the production process, involving both the production sector as other interlocutors.

Company B involves the sectors of production, quality, engineering, marketing, supply and information technology in the drafting of the final product. The productive sector is supervised by an industrial manager and also has three coordinators: systems management coordinator, coordinator of production control and materials coordinator. The sector's production of company B is subdivided into smaller sections: pre-selection and pre-supply of materials, stamping, welding, painting, product assembly, control panel assembly and final inspection. The manager emphasized that the industrial sectors of stamping and assembly control panel perform, largely, manual processes and therefore are considered critical areas to control losses and failures.

Production process steps

The industrial manager of company A said that the production flow is separated by time, that physical control is documented through quantities and costs and that is the mapping of time versus quantity of goods produced. This manager also notes that, at the time of completion of quality control, there is a process for collecting samples for the development, assembly and fixes the dosages of paints. The flowchart shown in Figure 2 details the steps of the production process of the company A.

Company A respondents point out that the activities effectively executed in the production environment are separation and printing the newspaper for distribution and that this final step of distribution is outsourced.

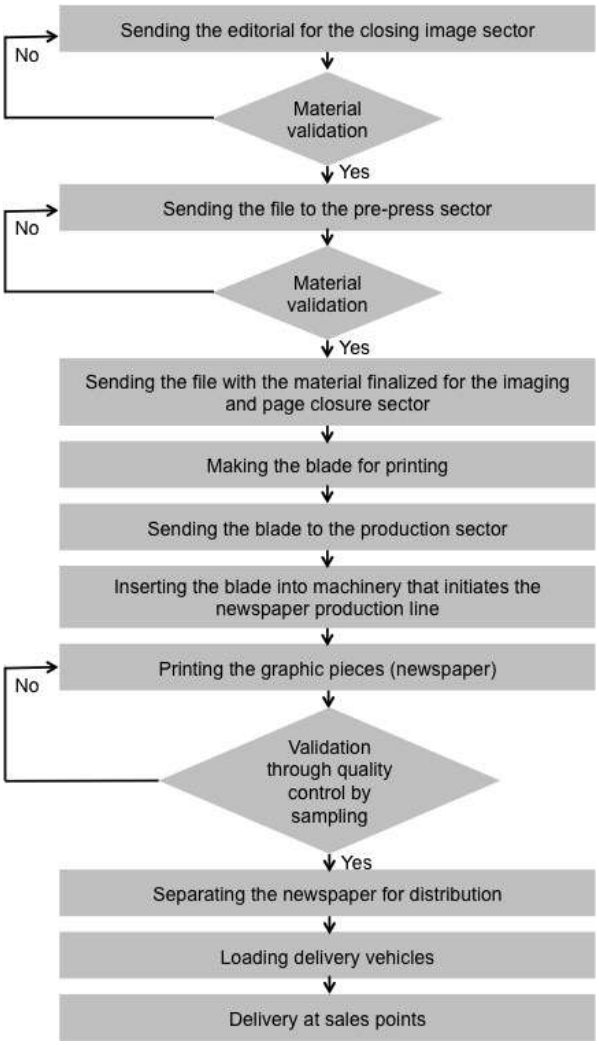

Figure 2: Production process flowchart of company A.

Already respondents highlighted that the company B production process begins with the demand for a product by the customer. Since these are projects of individual products, there is a check by supply sector, regarding to the parts that are used in this project. If any parts is missing in stock, the purchase order is issued promptly. As the project

developed, it is forwarded to the printing sector, receiving the steel plates, cut and fold to perform the piece. Later, the piece goes for welding, drilling and painting. Having made these processes, starts the assembly of the product pieces received from the suppliers. In parallel, the pre-selection and pre-supply of materials were carried out, so there is synchronization of processes. The assembly of the control panel is executed and tested. Riding the piece, this is sticked and goes to the test and inspection area. If the piece is in compliance, the product goes to the Distribution Center (DC) to be delivered to the customer.

The flowchart shown in Figure 3 details the steps of the production process of the company B.

Visual devices identified in the production environment

The company A makes use of visual and sound devices (Figure 4) in the workplace in some instances and stages of the production process, such as: in the beginning and cessation of the machines in order to operator safety; during the automatic separation, every fifty newspaper, searching for ease in counting the control of quantity and distribution thereafter; during the production of paper, by means of display in the control cabin, where the machine identifies the amount of produced pieces; after printing the blades newspaper, the machine related to this process gives an alert through a device that emits a red light and a beep, signaling the occurrence of a disconformity.

The similarity control of the real image with the printed image is done visually by the machine operator, denoting a quality control vulnerable to human error. Related to this procedure, the employees interviewed emphasized the creation, by operators in their own language through gestures, aiming at signal an increase or decrease in ink at the time of printing the newspaper pieces. This was consolidating itself due to the lack of visual devices that signaled this occurrence and also due to the large noise in the production environment and the great distance between the start and end of the production line.

Another moment of the process must be distinguished: the company A operator makes a visual control and realizes an occurrence just at the end of the paper roll on which is printed the newspaper. This procedure is susceptible to human error and there is a loss of raw material and time when changing coils. Sometimes, part of this waste material is reused in the production of a special newspaper section which has weekly edition.

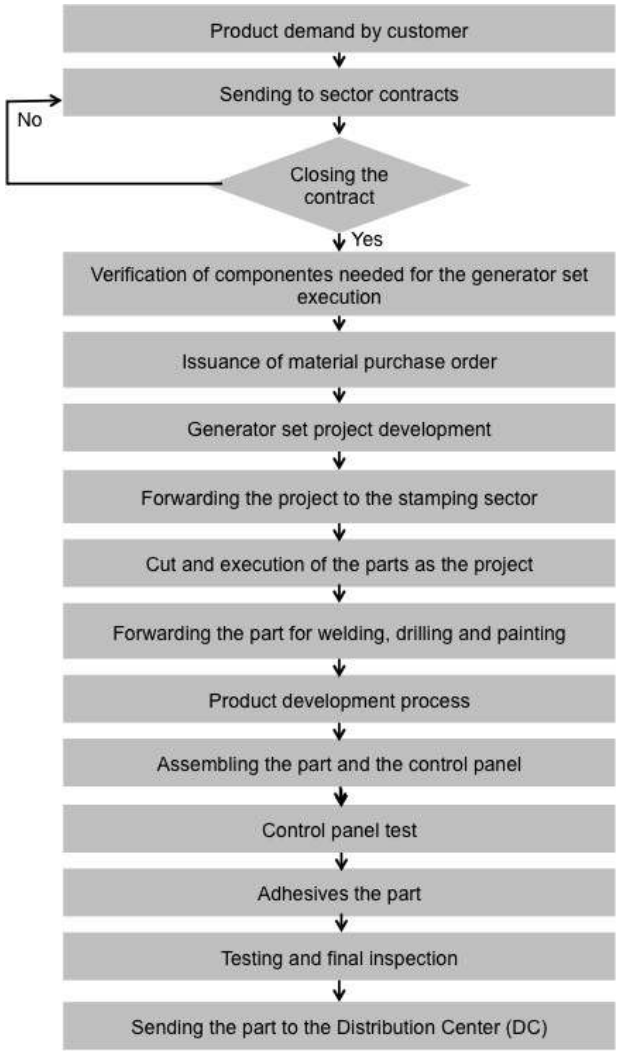

Figure 3: Production process flowchart of company B.

One aspect deserves mention, and it was highlighted by the manager and the employee interviewed by company A: the fact that there isn't

resistance by company management and staff in the use of visual and sound devices in the production environment. Moreover, it was noted that the direction encourages the use of these devices for obtaining the speed of production and the quality of the final product. Respondents also point out that some of these visual devices aid in achieving products without disconformities and, thus, the reader and advertiser satisfaction regarding print quality and loyalty the real image, contributing to the final performance required.

Figure 4: Examples of visual devices identified in the production environment of company A

About failures and loss control of the company A products, it is regularly monitored and recorded by the machine that produces the newspaper, through a display indicating only the number of copies with problems and the copies made successfully. According to respondents, the data are updated periodically in spreadsheets, in order to control potential losses as well as the productive capacity effectively performed.

Company B uses visual devices in all automated productive processes, as shown in figure 5. They can be listed as visual devices used in Company B as follows: light visual device to signal a lack of raw materials; bright visual device to indicate the stop of the production line or cell production; panels for control and spin parts in stock aiming a product becomes less than 24 hours in stock; panels to monitor losses and share information with employees involved in the process; murals with informative performance indicators of each area supplied by the sector of quality, control of materials by area (each area is identified with a color); kanban system to smaller parts and components such as screws for mounting of the generator set; marks on the surface to delimit production cells spaces. Still under implementation, company B emphasizes investments in Management System Machinery (SMG) to monitor the machines operation and also to share and make available, in real time, information from each production line and cell and any disconformity.

The company B respondents stressed that stamping and assembly control board sector, by using manual processes, and show difficulties to make use of visual devices.

Figure 5: Examples of visual devices identified in the production environment of company B.

Losses in the use or non-use of visual devices

At Company A, the losses are measured through periodic monitoring, indicates a loss in production rate of 1.5% to 2%, depending on the newspaper edition. However, there is no tool to measure the performance of each task separately, in order to identify possible inadequacies in the environment and in the flow of processes and even reduce certain operating times. The company A industrial manager also highlighted the lack of an information field and / or visual devices at certain stages of the production process, so it is important to maintain a better communication between players in the process. Among these steps, others were related: the quality control and the process of ink adjustment because it is currently used an informal language by staff and there is a lack of operational devices that provide this information to the process participants.

As most recurrent problems of company A were listed: the lack of paper roll and pitch error in the newspaper printing. Once are visually detected by

officials responsible for operation control, these failures are promptly addressed. Despite of this, they result in loss of time and raw material. To achieve the reduction of losses, company A notes that the current focus concentrates on the reduction of human error and operator training.

At Company B, some failures and losses were evident throughout the production process. There were identified products with more than 24 hours in stock, despite the control for quick turnover of stock held by company B. This indicates that visual devices designed for this control are not effective and need to be revised. Other steps in the generator sets production that have high losses and failures and not rely on fully automated processes are concentrated in the printing areas and in the control panel assembling. This one requires a specific knowledge of electrical installation and is one of the longest stages of the process as a whole. Visual devices that would aid a teamwork and avoid rework could be applied during this stage of production.

Another production moment of company B that requires more communication is in the contract closure and production request and supply area. To optimize the time of the production process, this area must provide a purchase order materials from the suppliers of certain components that have the greatest impact on production and not included in stock and aren't delivered in a short period of time. The deployment of audible or visual device that communicate this new occurrence could help better synchronization between the contract sector and the production area. It is worth mentioning losses monitoring and disseminating information to employees through informational murals perceived as positive actions to losses control of company B.

However, for both companies, it could be investigated possible failure points during the production process and not yet making use of visual devices. After mapped these points, visual devices could be studied and designed, helping the operators tasks, contributing to an environment if they are equipped with visual devices capable to minimize or even eliminate the human visual control. Furthermore, it is important to emphasize how important is integrating these devices in the visual system of the productive environment.

CONCLUSION

This study aimed to understand how visual devices are entered in production environment in two Brazilian manufacturing companies, identifying their functions and uses, as well as potential losses resulting from production processes. Based on the set of information collected, it was possible to realize how visual devices were used and how they were entered into the production environment of both companies. Through its functions and uses, there were identified the possible losses arising from the unavailability of information, lack of security controls, lack of controls and discontinuities of rework.

Throughout this study, it was possible to have a partial understanding of the companies surveyed regarding the importance of understanding the visual management as a strategic practice for the organization. From the data shown, it is possible to have a better understanding of the use of visual devices in the production environment of the company B to company A. Company A has not yet explored, effectively, the use of visual devices in critical parts of the production process. Since Company B has a better understanding of the importance and correct use of visual devices at key points of the production. It stands out as positive points of company B and that meet an agreed visual management system: availability of visual devices at key points in the production, deployment of a system for monitoring the operation of machinery and production lines, the concern with norms and standards of quality, investment in staff training and quality certification (ISO 9001). However, for the implementation of an effective visual system, it is still necessary a critical points mapping of failures and losses throughout the production process and

the development of visual and audio devices that assist in reducing waste and rework.

The research has the limitation to be applied in only two case studies, so it is not possible to generalize the results and conclusions obtained in the manufactury brazilian enterprises as a whole. Due to the wide variety of business structures and sectors of activity, it is suggest new researches on specific sectors of the market and / or specific organizational structures for future researches.

REFERENCES

Bardin, L. (2005). *Análise de conteúdo. ed. rev. e atual*. Lisboa: Edicões 70.

Galsworth, G. D. (1997). *Visual Systems: Harnessing the power of a visual workplace*. Amacom – American Management Association, EUA.

Gil, A. C. 1999. Métodos e técnicas de pesquisa social. 5.ed. São Paulo: Atlas.

Greif, M. (1991). *The Visual Factory. building participation through shared information*. Portland, Oregon: Productivity Press.

Koskela, L. (1992). *Application of New Production Philosophy to Construction*. CIFE Technical Report, n. 72, Center for Integrated Facility Engineering, Department of Civil Engineering: Stanford University, EUA.

Lean Institute Brasil (2012). Available at: <http://www.lean.org.br>. Acessed in: april, 2012.

Libãnio, C. S., Both, G. J., Lorenzini, G. C., Rucks, C., Amaral, F. G. (2012). Gerenciamento visual: uma revisão sistemática em teses e dissertações brasileiras. *Revista Negócios e Talentos*, v.1, Porto Alegre, RS.

Liff, S., Posey, P. A. (2004). Seeing is Believing: How the New Art of Visual Management Can Boost Performance Throughout your Organization, Amacom – American Management Association, EUA.

Liker, J. F. (2005). *O Modelo Toyota: 14 princípios de gestão do maior fabricante do mundo*. Porto Alegre: Bookman.

Malhotra, N. (2012). *Pesquisa de Marketing: Uma Orientacão Aplicada*. Porto Alegre: Bookman.

Martins, F. E. (2006). Diretrizes para o desenvolvimento de dispositivos visuais em linhas de produção enxuta no setor automotivo. Dissertation – UFPR, Curitiba.

Mestre, M., Steiner, A., STainer, L., Strom, B. (1999). Visual communications: the Japanese experience. Corporate Communications. *An International Journal*, 5 (11), 34-41.

Suzaki, K. (1993). *The New Shop Floor Management: Empowering people for continuous improvement*. New York: The Free Press.

Tezel, A., Koskela, L., Tzortzopoulos, P. (2008). Visual Management in Lean Construction. BuHu *8th International Postgraduate Research Conference*: Salford University, UK.

Yin, R. K. (2005). *Estudo de caso: planejamento e métodos*, 3ª Edição. Porto Alegre: Bookman.

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