

GUIDELINES FOR DEVISING AND ASSESSING VISUAL MANAGEMENT SYSTEMS IN CONSTRUCTION SITES

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1 INTRODUCTION

Visual Management (VM), defined as a sensory strategy for information management, has gained a prominent place in the Lean Production Philosophy, and is strongly connected to the core principle of increasing process transparency. However, the use of VM in construction sites is still relatively limited, and there is not much literature on the implementation of this principle. Recent research has mostly focused on the definition of categories for existing visual management practices or on the impacts of visual systems devised for specific purposes, such as production planning and control, or material supply. In fact, the introduction of visual devices is often viewed as something intuitive and based on common sense, without considering the demand for information in a systematic way, or the mental models of potential users.

This paper proposes guidelines for devising and assessing visual management systems, understood as sets of visual practices that should be integrated to managerial processes. These guidelines are meant to be a prescriptive contribution, i.e. it should be used as a reference for companies that intend to develop or refine visual management systems to support production management in construction projects.

2 RESEARCH METHOD

Design Science Research was the methodological approach adopted in this investigation, which consisted on a set of benchmarking studies, and on an empirical study conducted in a housebuilding firm (Company F) that is widely recognised as a leading company in the implementation of Lean Construction in Brazil. Initially, an overall assessment of the VM system implemented in one construction site was conducted. Then, a more focused analysis was made on the installation of drywall internal partitions. The main contributions of this investigation are related to the need of integrating visual devices in the managerial routines of the company, as well as to the difficulties of providing autonomy to the production crews, and the need of decentralized production controls.

3 RESEARCH FINDINGS

3.1 Benchmarking studies

Some visual management best practices were identified in the five benchmarking studies. Firstly, in all five companies' visual devices were highly used to support rituals of daily meetings that usually take place in the morning, before the start of the work shift, and lasts from five to thirty

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minutes. The agenda usually consists of: follow-up of the previous day production, problems occurred in the latest shift, the current day's schedule, weekly indicators analysis and action plans for performance improvement.

High importance was given by the five organizations to the use of A3 reports as a tool for problem solving and communication. All of them developed A3s to solve and document production and administrative problems, contributing to mitigate system's complexity.

3.2 Overall assessment of visual management devices

The relatively low level of participation of workers in the visual management system was made evident by the source of the information to be disseminated in visual devices. Most visual device information was produced by the site managerial team. Workers were rarely involved in the conception, or updating of visual devices, even though they had useful information for production management. Consequently, the site management team had to spend a considerable amount of their time in production control activities, which is contradictory with the idea that process transparency should be used for increasing the autonomy of the labour force.

The results presented above can assist the company in adjusting its visual management system in two complementary ways. Overall, it seems to be important for Company F to seek a balance on the use of visual devices among different managerial processes and to use visual devices that offer more support for production control and improvement. It would be better to have a smaller number of dynamic visual devices that effectively support decision-making and encourage reflection and collaboration, rather than having a large number of devices, most of them with a low impact in production management

3.3 Analysis of the Drywall Process

Some problems were detected in the kanban system. Due to an implementation problem, cards were used simply as inventory distribution sheets. Some of the information was not very clear for the labourers in charge of transportation, and the batches were not adequately distributed in each zone of the building. Based on discussions carried out in this investigation, the site management team decided to improve the kanban system. The new format of the card was more intuitive, and easier to understand. Due to the changes introduced, mostly concerned with giving more autonomy to workers, some improvements were identified: 6% reduction in gypsum plasterboard waste; reduction in the time spent counting components, higher productivity of the material supply teams, better organization of inventories, and increase in the motivation of the employees.

4 DISCUSSION AND CONCLUSION

Based on the literature review, in the benchmarking studies, and especially in the empirical study carried out, a set of guidelines for designing, implementing and assessing visual management systems have been proposed:

