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Ergonomic Issues in Lean Manufacturing

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Abstract

More and more companies are interested in the well-being and satisfaction of human resources. Nowadays, long term objectives are more important and advantageous for any company, especially for their employees. On the one hand, in order to have a productive and accomplished vision and future, every organization should continuously develop and adapt to new demands and offers. On the other hand, dealing with the right direction of performance implies many changes, unexpected problems, misunderstandings and slow steps. The lean manufacturing system is complex and benefic but the possible changes can bring ergonomical issues. The nature of the problems is often felt by the human resources, the most important element in an organization. This paper will present a qualitative briefing and review in order to understand the evolution of lean implication. The literature overview will point out the ergonomical issues that occur after the lean acceptance. This assessment is helped by five solid scientific materials, from different domains, which conclude in the end the authors' presumption.

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1. Introduction

Lean Manufacturing is a concept that appears more and more in companies which sustain human needs and their well-being. The well-being of the human resources has to be controlled and verified periodically. This paper shows the ergonomical issues of Lean Manufacturing after a quick briefing and research. The base of the study is composed

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of five articles which contain few issues that appear in companies, once with the Lean manufacturing implementation. This synthesis shows a difference between lean theory and lean practice, in reality the employees need feedback, direct involvements, security and promotion. The literature synthesis includes also strong conclusions which represent ergonomical solutions for Lean manufacturing.

2. A literature synthesis on Lean Manufacturing

The concept of lean manufacturing originated at Toyota, the Japanese automaker that has been thriving in the global competition for decades. In 1988, the Toyota Production System (TPS) was introduced. This concept was developed to survive with the minimum amount of resources in economic crisis. Due to vast shortages of material, financial and human resources, TPS was forced to choose the waste reduction policy in the shop floor as a strategic goal to achieve. During the hard economic conditions, Toyota sustained and prospered because of the high efficiency and productivity of its production system. (Behrouzi, F., Wong, K. Y., 2011)

2.1. Overview of lean manufacturing

Lean manufacturing represents a multifaceted concept that may be grouped together as distinct bundles of organizational practices. A list of lean practices includes just in time (JIT), total quality management, total preventive maintenance and human resource management, pull, flow, low setup, controlled processes, productive maintenance and involved employees. (Yang, M. G. M., et al. 2011).

The rapid growth in manufacturing has created a lot of economical, environmental and social problems from global warming to local waste disposal. There is a strong need to improve manufacturing performance so that is less industrial pollution, less material and energy consumption, less wastage, less psychological disorders for human resources. (Kumar, 2014).

Environment, safety and health (ESH) research has a strong tradition of conducting research in manufacturing to improve workplace ESH conditions and has tied it to management strategy and technical practices to many significant priorities: illness and injury prevention, environmental sustainability, psychological risks mitigation, corporate social responsibility, compliance with regulatory and insurance requirements.

The ESH field is well-known for conducting investigations in manufacturing to ameliorate and prevent occupational and environmental hazards. Traditionally, ESH has tied its management strategy and technical practices to prescribed priorities. Occupational illness and injury prevention long have been a hallmark of the ESH profession.

An integral part of the ESH field, both in research and for professional practitioners, is hazard analysis and risk assessment (Jensen, 2007). Hazard analysis involves prioritizing hazards by reviewing the potential consequences of a certain activity, ranging from negligible consequences to fatal consequences. It also involves assessing the probability of the hazard occurring. Once these have been assessed, an informed decision can be made as to how to deal with the hazard. This is often referred to as the Hierarchy of Controls and involves the following:

- Elimination: Review whether the hazard can be eliminated entirely
- Substitution: Review whether there is another less hazardous option such as a different chemical that might be used
- Modification: Review if the design of the work station or plant can be modified to resolve the hazard
- Isolation: Review if the hazard can be isolated and prevent contact with people or the environment
- Engineering Controls: Review whether a hazard can be resolved through engineering
- Administrative Controls: Review whether a hazard can be resolved through written protocols or management systems such as manipulation of work schedules
- Personal Protective Equipment (PPE): Review if PPE can resolve the hazard (Maxwell, 2011)

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