

Features of Lean Manufacturing in the Energy Sector

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Abstract

One of the energy companies' main goal is the efficient use of energy. A mean of attaining this goal is the lean manufacturing concept, which is growing increasingly popular around the world. Lean manufacturing is a concept in production management focusing on continuous improvement and eliminating production wastes [1]. The philosophy behind lean manufacturing roots from the Toyota Productions System developed at the Japanese company Toyota. This paper reviews the specifics of lean manufacturing in the energy industry. It identifies key problems of the energy sector, provides global statistical data on energy losses and classifies them. Implementing "Lean Energy" would increase the competitiveness of the companies operating in the energy industry, reduce some of the energy losses, and, consequently, help reach a qualitatively new level of operations. Prospect results of implementing "Lean energy" at OAO "Setevaya kompaniya", a territorial energy company conducting energy transportation in the Republic of Tatarstan, are presented in this paper. The main stages in the development of "Lean Energy" at the company are reviewed. The lean tools and methods implemented at the company are presented, along with the results of an internal and external audits of the company's production system. The practical implications of the study are seen as provisions of results of the analysis presented in the paper for future use by the companies implementing the lean manufacturing management system.

Keywords: lean manufacturing, production system, Toyota Production System, methods, tools, Energy Company, lean audit

I. INTRODUCTION

Recently, the world has seen a number of new concepts and management methods being created, such as business process reengineering, Total Quality Management (TQM), balanced

scorecard, statistical process management, ISO 9000, ISO 14000, HACCP, 5S, Six Sigma, and more.

One of the most relevant methods of production management is the Japanese concept of lean manufacturing (lean production), which implies continuous improvement of processes and elimination of all types of wastes present at the organisation. The philosophy of lean production was developed by an employee of the Japanese company Toyota (TPS — Toyota Production System) Taiichi Ohno in the post-war Japan, where the issue of restoring the country's industry and introducing its products to the global automotive markets became especially acute. [2] A huge contribution to the development of the lean manufacturing concept was made by Ohno's colleague Shigeo Shingo, who is also the inventor of the Single-Minute Exchange of Dies (SMED) system. [3] The novel Japanese concept of production involved the use of new organisational and technological solutions for assembly production and an individual approach to workers' motivation. A special system of mutual interest between the suppliers and the distributors of goods ascended Toyota onto a new level of operations in the late 1970s, facilitating effective development in the Japanese automotive market and ousting American manufacturers. The success of Toyota Production System marked a new stage in the global companies' understanding of this Japanese strategy, which subsequently led to the emergence of the lean management concept.

In post-industrial countries, lean systems have been widely developed and used for over a hundred years. A huge percentage of enterprises in Japan (90%), as well as in the USA (60%), Europe (50%), Canada, and Australia have adopted lean manufacturing. The concept helps companies to harmoniously develop in all directions, providing an appropriate level of quality and services, while reducing costs and satisfying their employees with working conditions.

Despite the rich foreign and domestic experience in the lean manufacturing systems, researchers point out the objective

