The Design of JMP/SAP Based Six Sigma Management System and its Application in SMED

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Abstract

Nowadays, while the product variety is increasing quickly in large-scale production enterprises, production lines begin to face with the problem of waste of time which caused by frequent exchange of die. In order to decrease different kinds of wastes in lean, six sigma management theory are put forward in the thesis. On the other hand, SAP, as one of the most widely used ERP tools, has been used by more and more enterprises as the tool for enterprise management, while JMP is an excellent new software in statistics. Therefore, this thesis aims to combine the outstanding data analysis ability of JMP with efficient management ability of SAP to make improvement on some assembly line in an enterprise, with the help of six sigma theory, in order to shorten the changeover time, improve the production efficiency and then realize lean production in the company.

Keywords: JMP; SAP; Six Sigma; SMED; Lean Production

1. Introduction

SMED (Single Minute Exchange of Die) is one of the lean production improvement modes in 50 century, which is developed by Japan’s Toyota motor company, aiming at dealing with the problems of production which is large in varieties, but less in quantities, as well as decreasing the inventory and improving the rapid response ability of the production system[1-3]. SMED can effectively shorten the time for machine installation and mould [4], it can also adjust production line production plan flexibly, meeting the diverse needs of the market. But in reality, most of the

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companies can’t receive the effect as expected due to some reasons, such as unreasonable layout of the workshop, incorrect steps of the production, operators’ unfamiliar with the procedures. Therefore, the advantages of SMED have not been shown completely in these companies.

Six sigma management is a systematic and comprehensive continuous improvement method, which can improve the quality of enterprise process management implementation principle and technology strictly, concentrated and efficiently [5]. It can help to greatly reduce the quality cost by pursuing “zero defects”. Therefore, using six sigma management can analyze and improve on the process of exchanging of die, basing on the production data, in order to shorten the time in exchanging of die.

Currently, most enterprises are using Excel and professional statistical analysis software Minitab as their six sigma improvement tool, especially Minitab, which owning special mode for six sigma management, but lacking in methods of data exchange with external channels, and the poor performance in dealing with large quantities of data. Anew software JMP successfully make up for the inadequacy of Minitab in this aspect, it not only has the powerful data processing ability, but also has a variety of external interactions [6]. What’s more, SAP system as one of the best enterprise management software in the world, are playing an indispensable role in various types of domestic enterprises, including manufacture enterprises. SAP system integrates all resources in enterprise, and conducts a comprehensive integration management on the logistics, cash flow, and information flow. It can also make a balance on all resources, and integrate each business unit of internal production and operation system in the enterprises. Therefore, this thesis makes SAP system interaction with JMP in order to acquire production data conveniently from SAP system, then make combination with targeted real-time production data, using the ability of data analysis of JMP, and then make a better plan on the assembly line, finally improve the level of business operations.

2. The design of six sigma management system based on JMP/SAP

The five stages of six sigma improvement model DMAIC (define, measure, analyze, improve, control) is the core Six sigma management system based on JMP/SAP system. In this system, operators can acquire batch data of production in different stages through the top of the SAP system as required, and then make connection between JMP and SAP system, finally put forward an efficient improvement plan after analyzing on production data by using JMP. The framework of this system is shown as Fig. 1.

2.1. The design of JMP/SAP interaction system

In the design of this system, the interaction of JMP and SAP is the key.
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