Conception of Construction of MES Computer Intelligent Management Model in Tobacco Industry

Xina Li¹, Jianji Xing, Haofeng Yan, Zheng Sun, Hongtao Zhang

Luoyang Cigarette Factory, Henan Tobacco industry co. LTD, China

*E-mail: xylixn@hatic.com

Abstract. As MES is widely used in tobacco production and manufacturing, the quality control and evaluation of tobacco enterprises have been greatly improved. This paper expounds the application significance and necessity of MES in tobacco industry, through studying several methods of optimizing quality control and improving quality evaluation through computer intelligent management model in Luoyang cigarette factory on the basis of MES, and realizing MES iterative improvement in this process, which provides a reference example for quality management and improvement evaluation of tobacco production enterprises.

Keywords: Tobacco Industry, MES, Computer Intelligent Management

1. Introduction

As early as the end of the last century, digital production began, ERP, MES and so on have entered the domestic manufacturing enterprises. At the beginning of digital production, many enterprises have introduced a large number of digital equipment will upgrade production from manual to automatic production, so that many enterprises have tasted the sweetness of technology upgrading. The next ERP, however, makes many enterprises suffer a loss, because the ERP is to carry on the information transformation to the operation management of the enterprise, if you want to deploy successfully ERP, you must ensure that the management process of the enterprise is reasonable and can be strictly enforced. Because many enterprises do not realize this key point, just simply think it and digital equipment transformation, online can create profits, as a result of their own business management did not keep up with so that ERP did not play a good role in the management of enterprises, and even drag down the production of enterprises, waste a lot of human, material and financial resources. So, when MES was just introduced into the country, many people thought it was the second "ERP", waste a lot of manpower and material resources, but there would be no obvious gain. The cautious attitude towards MES has enabled MES to be accepted gradually, rather than as in the ERP, because the pursuit of rapid returns has led to the rush of some projects, with adverse consequences for other
enterprise deployment ERP. At present, the rapid rise of computer, the rapid and in-depth research of intelligence, the shortening of the transformation period of computer intelligence achievements, and the new opportunity for the iterative renewal of MES, tobacco enterprises to use computer intelligence to establish a new management model is possible. After applying the MES, the three-tier architecture is shown in Figure 1.

![Three-tier Architecture](image)

**Figure 1. Application MES 3-tier architecture**

The tobacco industry is an industry strictly managed by the state, which should not only ban smoking, but also produce reasonably and create a large amount of profits for the country. Therefore, tobacco enterprises are very sensitive to the efficiency of production, and must maintain higher production efficiency in order to minimize the harm of tobacco to people's health and create greater benefits at the same time\(^1\). By analyzing the production characteristics of tobacco enterprises and the deployment and application characteristics of MES, this paper provides a new production management idea for Luoyang cigarette factory, in order to achieve the purpose of continuously optimizing quality control and continuously improving quality evaluation, and to realize the whole life cycle management of the whole production execution link.

2. **Background**

In order to prove the feasibility of the concept in the paper, and to enhance its persuasion, this paper cites some practical cases of Luoyang cigarette factory.

2.1. **Realistic context**

After the establishment of the factory, Luoyang Cigarette Factory has actively explored new models and management ideas of fine, characteristic and specialized management, and has developed steadily\(^2\). The production management model has realized the transformation from manual to automatic. MES system design fully takes into account the current production, processing, manufacturing and enterprise management model of Luoyang Factory, as well as the requirements of integrated control and control of group information system. In order to help achieve "unique, full of charm, full of vitality" of the modern cigarette manufacturing plant to do a good job of support.
2.2. MES the necessity of quality evaluation research

The implementation of the MES is not completely positive correlation with the profits of the enterprise. It is not that the more financial, material and material resources the enterprise invests in the MES, the more benefits the MES will bring to the enterprise. On the contrary, the survey results of the existing tobacco enterprises that implement the MES show that only about 20% of the enterprises can make good use of MES and realize system integration and obtain benefits from the optimized production execution management process\(^3\). More often than not, disconnect between MES and actual production has made MES virtual and has even had a negative impact on production management activities. So how to evaluate the implementation performance of enterprise MES, so as to be an important reference for MES to improve the implementation process, become the most concerned problem of tobacco enterprise managers, and is also the problem that this paper expects to solve. MES performance evaluation is to evaluate and evaluate the performance and efficiency effect of the enterprise after the implementation of the MES. The purpose of the evaluation is to examine the impact of the MES application on the management and management of the enterprise from the purpose and strategy of the implementation of the enterprise. Through evaluation MES application performance, first, enterprises can make a comprehensive evaluation of the whole process, thoroughly check the current situation of MES application, determine the stage of implementation; second, enterprises can compare with the results achieved after implementation according to the quantifiable goals and success standards established in the early stage of MES implementation, and analyze the reasons and find out the shortcomings, so as to "carry forward the advantages and make up for the deficiencies" in the process of continuous improvement, thus eliminating the phenomenon of high input and low output in the construction of information systems\(^3\). The performance evaluation should not only check whether the enterprise has achieved the expected goal, but also further formulate new and higher goals, so that the enterprise has a sustained stamina in the environment of global market competition, and embody the concept of "enterprising and unremitting" in modern management. At present, there is no standard performance evaluation system for MES application at home and abroad, so it is necessary to carry out in-depth and extensive discussion and research on this subject. This is very important for scientific evaluation, further improvement of MES daily review and acceptance standards, correct understanding of MES characteristics and functions, and effective improvement of MES application level and management level of tobacco enterprises in China.

3. The design of MES of Luoyang Cigarette Factory under ISA95 standard

The MES system functions from the point of view of ISA95 standard, from the workshop level PCS plan, standard distribution and real-time display, to the factory level production resources optimization management, and then to receive the company level ERP plan information, the system function runs through all the production management links of the whole plant; the system starts from the production, quality, equipment, site, personnel aspects, management function module and business flow appropriate consistent, achieve business and process seamless connection, fully meet the production management needs of Luoyang cigarette factory. EMS design function is shown in Figure 2.
Figure 2. MES design function

4. Application conception of computer intelligent management model based on MES in quality control and quality improvement evaluation

4.1. Intelligent extraction of field data to achieve quality control
The MES system supports each management activity with targeted data, urges all kinds of core management activities of Luoyang factory to execute and summarize by means of information technology, deepens the application MES system, makes the massive historical data collected by the MES system division of labor clear classification output, combines the data with the management, promotes the management, pulls the execution, draws the business department and the MES relations, provides the user with the upper management function which pays more attention outside the basic business operation function, makes the system and the management binding, the management and the personnel binding, the personnel and the execution binding, the execution and the improvement binding, Make the system to support the enterprise management to play the greatest role\cite{4}.

4.2. Intelligent and automatic coordination of knowledge base makes quality control more precise
MES "production problem alarm evaluation improvement" function combined with "on-site problem work method ", the production process quality, equipment downtime and other aspects of the problems automatically pushed to the" problem processing center ", triggered a pre-set problem processing process, layer by layer forwarding, until the problem is resolved, the final system administrator to the problem has been processed to audit the valuable problems, processing methods to the knowledge base for the reference of relevant personnel\cite{5}. At the same time, the knowledge base also provides information on the relevant management innovation and technological innovation knowledge of personnel at all levels, so as to facilitate professionals in various fields to make suggestions for
enterprise improvement. At the same time, the reference can also supplement the questions raised by the information source provider of the knowledge base, fully mobilize the enthusiasm of the whole plant personnel to participate in the use of the MES, and establish a good atmosphere for full staff interaction.

4.3. Intelligent comparison of real-time indicators to achieve continuous monitoring improvement
MES "Key Performance Indicators Evaluation Improvement" provides information management means for Luoyang Cigarette Factory to monitor the implementation of key performance indicators and the management of standard evaluation[6].

5. Conclusion
According to the needs of the tobacco industry to adapt to the times, this paper analyzes the production characteristics of the tobacco industry, and puts forward a new model of computer intelligent control system based on MES, which is applied to the quality control and improvement quality evaluation of the tobacco industry[7]. MES can help tobacco enterprises to improve the depth and intensity of production management and intelligent computer management can also help enterprises to achieve the quality management and traceability of the whole product life cycle. Finally, through the organic integration application in tobacco enterprises, it is proved that the computer intelligent management model based on MES can improve the efficiency of tobacco enterprises' management and control management and production, and realize the real-time tracking improvement of quality evaluation, which is of great help to enhance the ability and core competitiveness of enterprises to adapt to the times.

References
[1] Chen Danhua. Analysis on Evaluation of Effectiveness of Quality Management System of Tobacco Enterprises [J].Managers ,2014(19):59-59.
[2] Zhao Yuli. Application of multivariable analysis in tobacco quality evaluation [J].Enterprise Technology and Development ,2014(07):27-29.
[3] He Zhe. MES Performance Evaluation of Tobacco Enterprises Based on Value Chain Theory [D].Hunan Normal University ,2011.
[4] Yin Gang. Study on the Improvement of Manufacturing Execution System (MES) and its Application in Tobacco Enterprises [D].2009.
[5] Wang Peng. Production Implementation System (MES) Application in Tobacco Industry [J].Tobacco Technology ,2002(3):15-17.
[6] Hu Jun. MES Application and Analysis in Cigarette Industry Production Process and Quality Control [D].Nanjing University of Technology.
[7] To pine. MES Application in Automatic Control of Tobacco Industry [J].China Hi-tech Zone ,2018(06):193.