

PMES-Digital Reports

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Abstract- Manufacturing Execution Systems (MES) are computerized systems used in manufacturing to track and document the transformation of raw materials into finished goods. MES provides information that helps manufacturing decision makers to understand how current conditions on the shop floor can be optimized to improve production output. MES works in real-time to enable the control of multiple elements of the production process (e.g., material, personnel, machines, processes).

Index Terms- Manufacturing Execution Systems (MES)

I. INTRODUCTION

The Biggest challenge in today's Era for Manufacturing Industries is to track and maintain the production record with the Traceability of each part or batch along with its behavior during the Manufacturing Process in plants

Industry 4.0 refers to the “smart” and connected production systems that are designed to sense, predict, and interact with the physical world, so as to make decisions that support production in real time. In manufacturing, it can increase productivity, energy efficiency, and sustainability.



Fig.2 Industrial Revolution

2. Working Principle

Working of MES is based on combination of Hardware and software will the help of internet and applications. Digital Documentation and record monitoring by different application

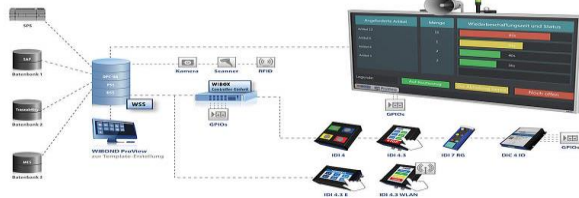


Fig.1 MES Background

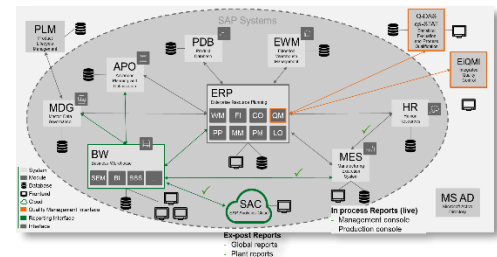


Fig.3 Hardware/Software in MES

II. LITERATURE SURVEY

1. Objective of Study

Industry 4.0

Technical advances also change the way humans produce things. The step into production technology, which was completely different from the past, is also called the industrial revolution.

The new production technologies fundamentally changed the working conditions and lifestyles of people. What were the industrial revolutions and where do we find ourselves now? “From the First Industrial Revolution to Industry 4.0”

3. Application of MES

You can use the data provided by MES to optimize operations. Combining information from MES with the data available from other industrial and enterprise sources, you can begin to optimize operations across their entire enterprise.

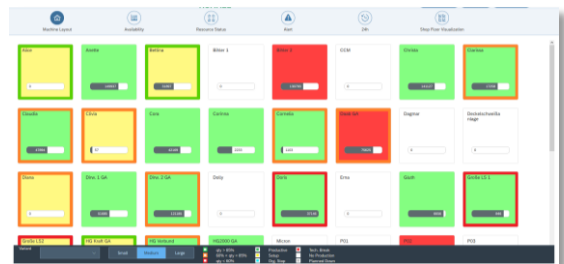


Fig.4 MES Data Monitor (Output)

4. Opportunities and Challenges of MES

Opportunities

- Industry 4.0 have wide range of industries where it can be implemented and useful for their manufacturing process, by implementing this they get the Gaps or breaks which are major contribution in OEE losses now days.
- Industry 4.0 is a smart solution where we does not require bunch Pf paper and long record room to keep the old production data.
- Industry 4.0 is also help us to analysis the gaps and opportunities in cloud base Analytic tools.
- Agility and Customization. Industry 4.0 implementation enables real-time planning and control, permitting organizations to be flexible and agile in responding to rapidly changing conditions; for example, by faster reacting to changes in demand, supply, and prices, companies can reduce planning cycles and frozen periods. Future events and trends, such as consumer behavior, delivery time, and industrial output, can be predicted using business analytics techniques. Real-time delivery routing and tracking also allow logistics operations to be more flexible, efficient, and agile.

Challenges

There are also some intimidating resisting forces, barriers, for implementing Industry 4.0 practices. These obstacles may be classified under the following business dimensions:

Firstly, Financial constraints. Financial constraints are a fundamental issue in implementing Industry 4.0 in terms of developing sophisticated contemporary infrastructure and sustainable process improvements. Secondly, the technical competency of the focal organization is the key focus that influences the scale of investment.

The economic perspective, on the other hand, is still in its infancy; a lack of clarity about cost–benefit analysis and monetary rewards on digital investments is a critical issue for deploying Industry 4.0

III. COMPONENTS AND SOFTWARE

1. Components used in the Project

Selection of PLC

The PLCs are used in this projects are as follow

FX5U32M

The Mitsubishi FX5U series iQ platform compatible programmable logic controller (PLC) has 16 digital input (type 24VDC sink/source) and 16 relay/transistor outputs.

MELSEC communication protocol (3C/4C Frames) and MELSOFT connection. It has 64k steps program capacity and 16 built-in input



Fig.5 Mitsubishi FX5U

Sensor

Sensor used in MES as per application and function requirement, it can be Digital, Analog or proximity sensor to provide the Data and conformation to MES about the part and data values.



Fig.6 Industrial Sensor

IV. CONCLUSION

This study contributes to bridging the critical gap, by discussing the key components, characteristics, effects on many dimensions, drivers, barriers, and other implementation challenges of Industry 4.0, the fourth industrial revolution describes a future production system’s vision. Industry 4.0 is an inevitable revolution covering a wide range of innovative technologies, such as cyber-physical systems, RFID technologies, IoT, cloud computing, big data analytics, advanced robotics, smart factories, etc. The Industry 4.0 paradigm is transforming business in many industries, e.g., automotive, logistics, aerospace, and energy sectors, etc. Industry 4.0 realizes the development and integration of information and communication technologies into business processes. The capabilities or components of Industry 4.0 bring significant advantages to organizations, including customization of products, real-time data analysis, increased visibility, autonomous monitoring and control, dynamic product design and development, enhanced productivity, and competitiveness.

REFERENCES

Text Book On

1. Industry 4.0: Current Status and Future Trends
2. Industry 4.0: Managing the Digital Transformation
3. Recent Trends and Best Practices in Industry 4. 0