

Chemical Enterprise Production Management System Based on ERP

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This paper studies the status and problems of applying ERP systems in chemical enterprises in order to effectively implement the ERP system, reduce production cost, improve economic efficiency and promote scientific and standard management of enterprises. The theory of ERP is described first. Then the problems of production management, the relations between production department and other departments and so on are analyzed. To solve the above problem, this paper studies the application of ERP in production management system of chemical industry to promote successful implementation of ERP system. The feasibility analysis of ERP in the production management system will bring healthy, rapid and sustainable development of chemical enterprises, and accelerate the information transformation from "Made in China" to "Innovation in China" in chemical industry.

1. Introduction

The chemical industry is a typical process manufacturing industry (Zhao and Zhan, 2014). Different from the mechanical processing industry, real estate industry and home appliance industry, it has a large variety of materials, complex chemical products, continuous production, complex cost accounting and standard quality management (Mukund, 2014). China's chemical industry information is still in the primary stage, and has just undergone extensive development, the awareness of the management and the infrastructure of enterprises has not reached high level (Horng-Jyh, 2016, Mehrdad and Mohammad, 2014). The core competitiveness, costs and whether the management is willing to invest on it are problems for most chemical enterprises. Only a small number of domestic enterprises realize the business and management informatization and benefit from it (Azma and Mostafapour, 2012). To improve the competitiveness of domestic enterprises and multinational company (MNC), it is necessary to transit from cost advantage to compound core competence. Therefore, it is necessary to carry out informationization, build a conservation-oriented enterprise and realize the refinement and integration of production and operation (Moscoso-Zea et al., 2016, Jie, 2013).

2. ERP theory and application

2.1 Definition of ERP

Enterprise Resource Planning (ERP) (Ali et al., 2015, Sabah and Naoufel, 2017) is an information management platform that integrates the production, procurement, sales, inventory, finance and other business of an enterprise to achieve standard information and data, integrated system operation, reasonable business processes, dynamic performance monitoring and continuous improvement management (Arboleda and Royer, 2013, Nasir et al., 2015). After years of development, the management idea of ERP is extensive and profound, reflecting the spirit of lean and agile manufacturing (Chofreh et al., 2014, Amid, et al., 2012). It also integrates quality management to guarantee high quality and customer satisfaction (Shen et al., 2016). The implementation of ERP system requires a series of analysis, planning and design, combined with the management of the enterprise (Al-Shardan and Ziani, 2015, Galindo et al., 2015). Figure 1 shows the implementation process.

2.2 Module of ERP production management system

The production management system is one of the core systems of the ERP system. It integrates the entire production process of an enterprise to reduce the inventory, increase the total asset turnover rate and improve the management efficiency. The production management system connects all production processes to avoid confusion in the production system, reduced efficiency or delays in delivery. Production management is a cycle process of planning, supervision, coordination and control. Process orientation is the planning. All other work is guided by it. After the leadership determines the master production plan, the master production plan is further decomposed as the basis for implementation by various departments. The production department organizes the production according to the plan. The purchasing department organizes the procurement of materials according to the plan. The finance department prepares the funds accordingly, the sales department develops the market accordingly, and so on. Figure 2 shows the module of production management system.

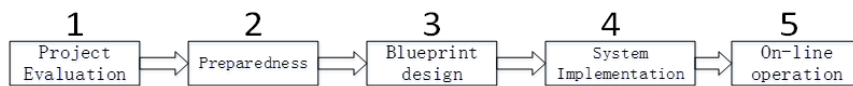


Figure 1: The implementation stage of the project

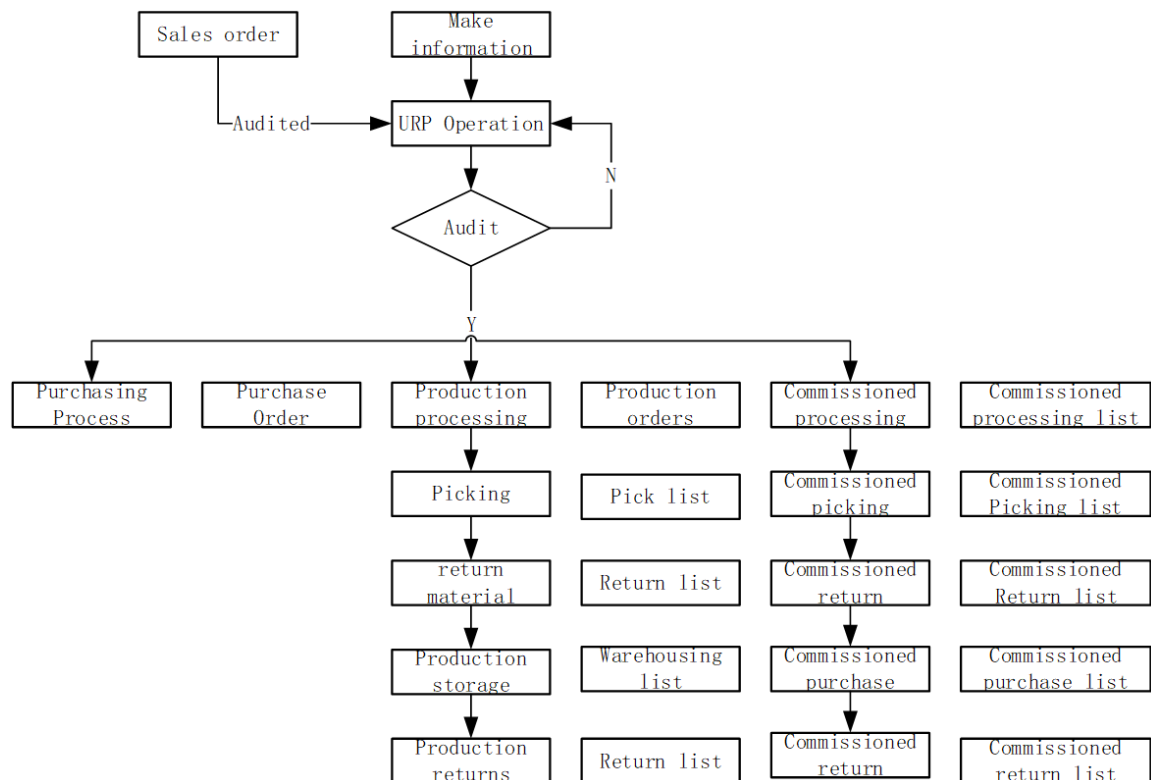


Figure 2: The module of production management system

3. Problems in chemical enterprises production management

3.1 Problems in equipment management

Typical chemical enterprise is characterized by strong continuity of processes and correlation of each section. Chemical equipment works in corrosive environment for long-term with high failure rate. Damage to any equipment or even a spare part may cause stopping of the system. Therefore, the equipment of entire process shall be managed completely and systematically. At present, typical problems of equipment include:

- (1) Responsibilities of equipment/process engineers in production department and workshops are not clear. There is overlap;
- (2) Specifications of spares are not standard. Multiple specifications are set for the same material, causing duplicate purchase applications and inaccurate inventory control;

- (3) The types of spare parts are not standard, resulting in inaccurate inspection. The cost or capital is not clear for all of them are used for production;
- (4) Accounts for disposal of fixed assets are not clear. The equipment is not placed in designated place after disposal. The management of disassembled equipment is not standard;
- (5) The equipment archive is incomplete. The maintenance records, outsourcing settlement and other data are confused. The equipment operation & maintenance cost report is missing.

3.2 Problems in coordination management of production department and other departments

The production department needs to communicate with many departments such as sales and purchasing, and there are many problems in daily communication.

- (1) The production plan often conflicts with the actual production due to many factors, resulting in large variations in procurement plan of materials reported in the workshop and more emergencies, and increased procurement costs. In case of problems of purchased materials, the production cannot be carried out, and it takes long time to handle, difficult to obtain evidence, resulting in huge loss.
- (2) When the sales order changes, the sales department cannot inform the production department in time, and sometimes the products that need to be shipped will not be produced. This will result in the delay of delivery and short-term warehouse of unneeded products to affect the cash flow. Similarly, as the production system needs maintenance, due to lack of communication, the sales department conducts a pre-sale. The product cannot enter warehouse and fails to be delivered on time.

4. ERP production management policy

4.1 Equipment management policy

Subject to the problem of equipment management, the solutions are as follows:

- (1) Redefine the functions and responsibilities and re-lay the post according to the organizational structure;
- (2) Get spare parts following the corresponding procedures. Record the items exit warehouse and the expected recycled items;
- (3) Effective management of fixed asset registration system. Perfect equipment archives. Keep daily maintenance/care records and expenses system;

In the process of equipment information management, the entire life cycle of the equipment needs to be monitored in real time. The software developers design the equipment management system according to the equipment management needs and the problems to be solved, so as to form the overall functional structure, including: archives management, operation management, accident management, check management, service management, maintenance management, procurement management, lubrication management and so on (Figure 3).

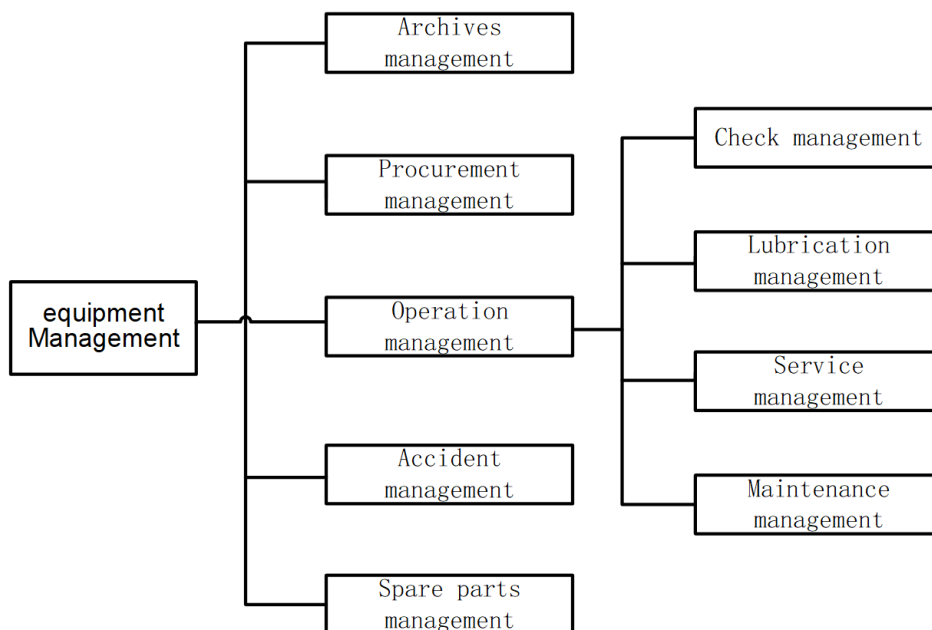


Figure 3: The functions of the equipment management system

The archives management, procurement management, operation management, accident management and spare parts management have their own flow chart (Figure 4 and Figure 5).

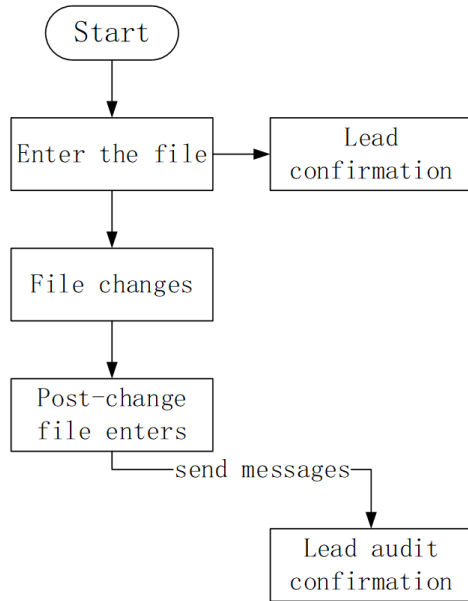


Figure 4: The flow chart of the equipment archives management

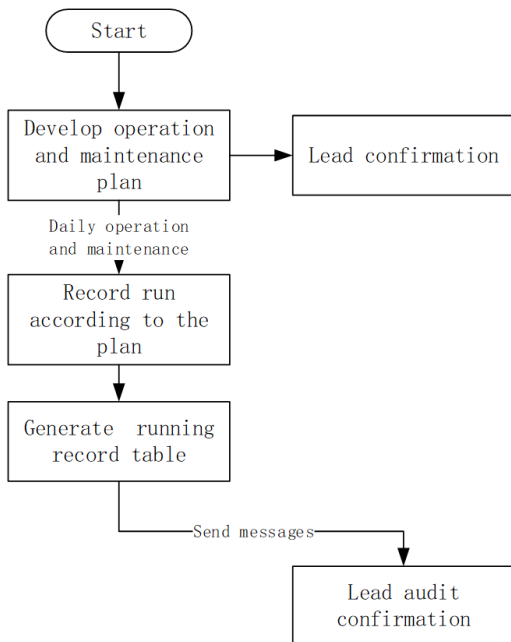


Figure 5: The flow chart of the equipment operation management

4.2 ERP coordination management policy

Subject to the coordination management problem between the production department and other departments, the solutions are as follows:

- (1) The enterprise prepared the relevant procedures. The competent authority conducts a rolling evaluation of supplier's credit to determine and establish a list of qualified suppliers. Select suppliers from the list of qualified suppliers for procurement.

(2) The sales department tracks orders, and contact with the production department at any time. For any problems concerning the order, carry out transfer of goods, emergency production and other means to meet customer needs.

The ERP coordination management process is designed based on the organization structure, the business of the organization and the actual situation at present. Various resources and production, supply, marketing and other processes of the enterprise are organized, deployed and controlled in an effective and reasonable way through scientific and effective management, to enhance the overall operation efficiency. The business-specific processes are established through the sort of processes (Figure 6).

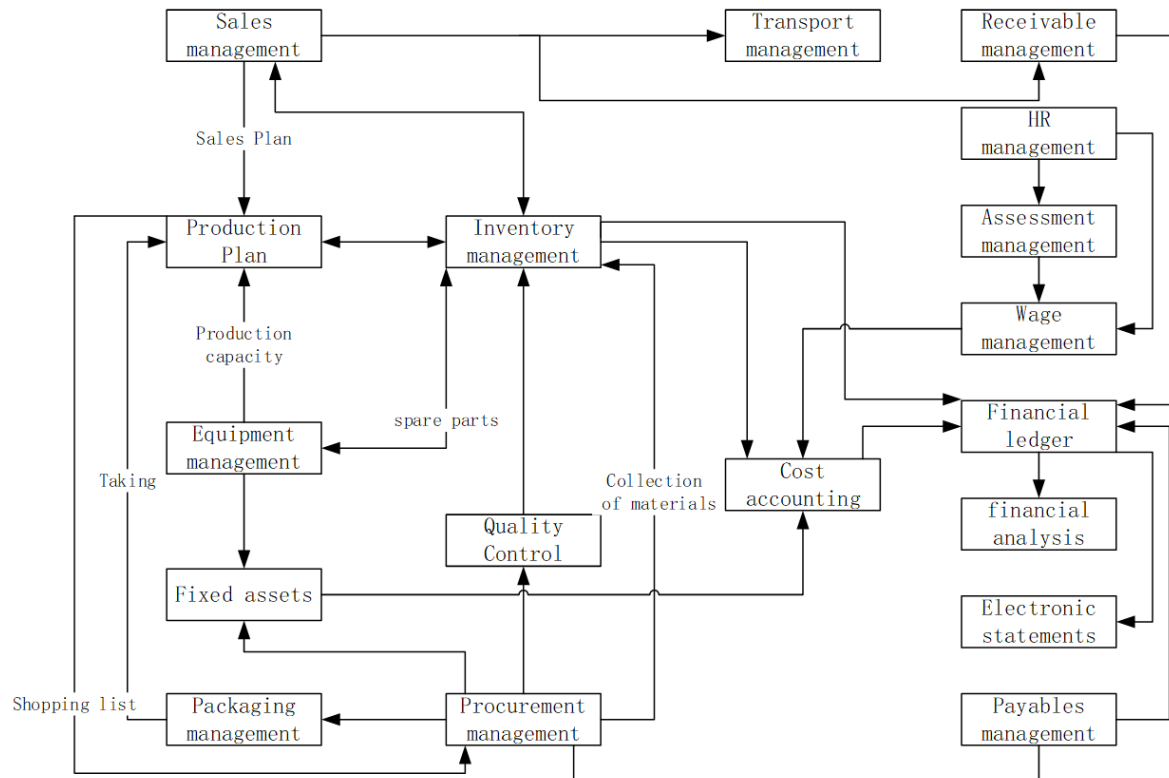


Figure 6: The flow chart of enterprises ERP system

5. Conclusion

China's chemical industry must take a new road to industrialization featuring high technology, good economic returns, low resource consumption, less environmental pollution and full play to human resources so as to develop rapidly in the world. To achieve this goal, we must adopt information technology. To build "resource-saving" enterprises and achieve the refinement and integrated production and management, the application of ERP is an effective way. ERP is a concept of development and an open system. Chemical enterprises shall integrate various advanced management ideas, methods and technologies in application of ERP, keep pace with the times for continuous improvement and solving problems. We should integrate business management to maximize the efficiency of operations and ultimately enhance the core competitiveness of enterprises based on overall optimization of business resources.

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