

# *Research on production planning and Control optimization of C Company*

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**Abstract:** C company mainly carries out small batch production of single piece, and its batch repetition rate is low. In the actual production process, the production organization activities are complex, production continuity and load balance, production cycle is difficult to control, and production process is disturbed by many factors. Therefore, in this paper, the C company for research to improve production planning and control system, is designed to solve the deficiency of the existing planning system framework, strengthen the continuity of the planning process and accuracy, and strengthen the control of real-time and comprehensive, set up system, standard and scientific production planning system, strive to improve the C company facing the issues of production control system with the production process.

## 1. Introduction

Since the beginning of the 21st century, the continuous integrated development of new generation information technologies, such as industrial Internet of Things, big data and cloud computing, and the manufacturing industry has promoted the transformation of manufacturing enterprises into digital and intelligent production mode. C company plans to implement centralized planning, hierarchical management mode of control, "hierarchical" plan management way, makes the specialized plan are standing on their own perspective, but doesn't take into account the upstream and downstream plan together, the most direct impact is wip inventory backlog serious and material shortages, at the same time, combined with the lack of information means for information transfer plan, real-time management difficulty, so need to develop scientific and reasonable production planning system framework to deal with complicated production environment [1].

## 2. Research status and development trend of theoretical methods

Domestic and foreign experts and scholars have studied production planning and control quite

early. The main research methods include production cycle method, Gantt chart method and network planning chart method [2]. With the development of enterprise production and in-depth research, material demand planning (MRP), manufacturing resource planning (MRPII), enterprise resource planning (ERP), just-in-time production (JIT), constraint theory (TOC) and other methods have emerged successively, which play a great guiding role in enterprise production planning and control [3]. With the popularization of computer technology and its application in production operation management, production planning and control technology has developed rapidly, and many advanced theories have appeared in this field. Such as MRP, MRP II, ERP, JIT, OPT, TOC, LP, etc. In recent years, many people have studied the above production planning and control methods, simulated and compared their performance, and tried to rank their performance. By comparing Gerhard Plenert, Thomas D Best and Lii LJT, the order of their performance is TOC, JIT and MRP from top to bottom [4] [5].

### 3. Problems in the production planning system of Company C

This paper takes C Company as the research object. Through investigation, the existing planning system of C Company is based on the plan of "three levels and five levels". The three levels refer to the planning layer, the target layer and the operation layer, and the five levels refer to the year, season, month, week and day according to the time dimension. Through in-depth analysis about the present situation of C company planning and control, clearly recognizing the production plan and control the status quo, from the material requirement planning and manufacturing resources plan, lean production, function, operation and management, such as Angle of view to analyze problems, and from the aspects such as organizational structure, the degree of informationization, supervision and management to analyze the causes of the problem. The study found that at present, C company is faced with increasing production tasks, which require the company to comprehensively optimize resources integration, planning and inventory management, etc., so a scientific and reasonable production planning system is needed to cope with the increasing complex production tasks. This paper analyzes the problems of production planning system in depth, finds out the factors hindering orderly production, and puts forward the solutions. Combined with the application of advanced theories at home and abroad to guide the analysis of practical problems, to build a reasonable production planning framework for C Company.

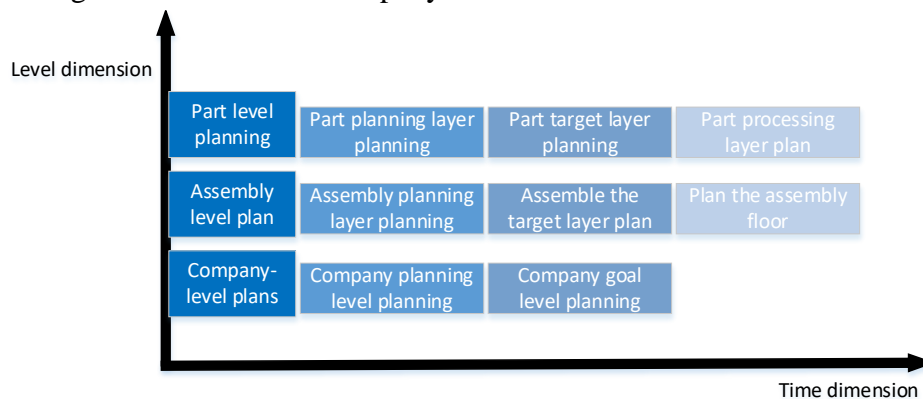


Figure. 1 Plan hierarchy diagram

### 4. Research routes and solutions

Mainly adopts the method of combining theory and practice of the first through the relevant

theoretical research, understand the production planning and control of the practical application of research methods and the present situation, pulsating assembly line, JIT and TOC application method [6] [7], combining the actual production planning and control of C company the status quo, put forward the improvement opinion, construct the C production planning system of the company. Secondly, in order to verify the effectiveness of the solution, the proposed solution is verified and analyzed according to an example.

#### 4.1 Research technical route

(1) Combination of theoretical methods and real columns. Collect and read the small batch more varieties of production planning and control at home and abroad related literature, especially the application of discrete workshop example, analysis the advantages and disadvantages of existing methods, understanding the development trend of future research, in combination with the actual characteristics of discrete manufacturing plant production and management, based on the discrete manufacturing shop production planning and control to improve method [8]. In order to verify the effectiveness of the proposed discrete workshop production planning system, the case study method is used to compare and analyze the case results.

(2) The method of constraint theory (TOC) is usually realized by DBR method, namely drum-buffer-rope. By analyzing the actual production status and production mode of C company, DBR method is applied TOC company to make it adapt to the actual production management of the enterprise [9].

(3) Quantitative analysis of DBR production planning and control is carried out by applying particle swarm optimization algorithm to replace traditional empirical determination and reduce the fuzziness of parameters [10]. Optimize the parameters and determine the optimal number of cache to minimize the redundancy of the production system [11].

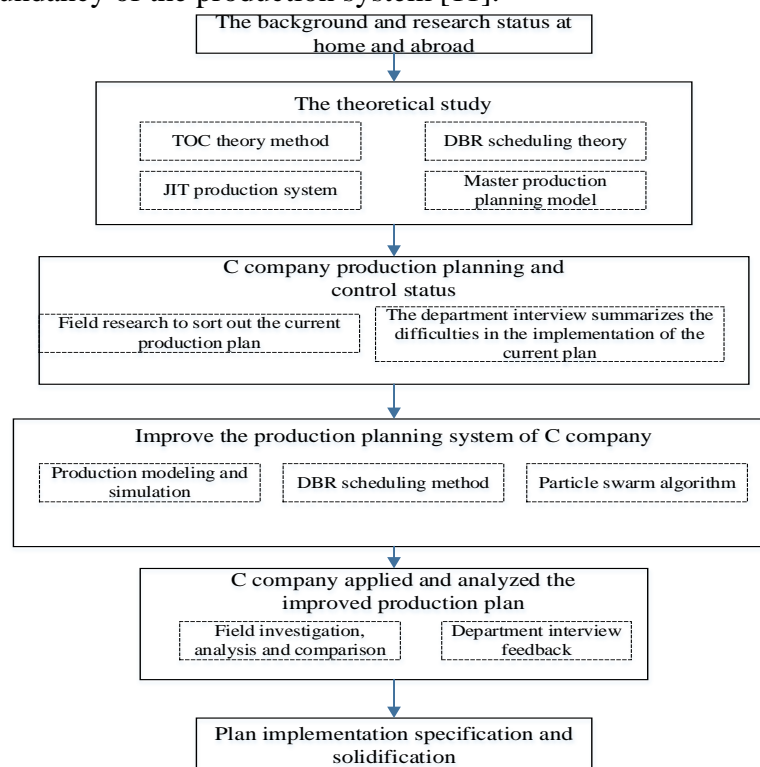



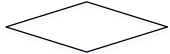


Figure. 2 The research route

According to the existing production planning problems of C Company, relevant theories and methods are used to re-compile company-level, assembly-level and parts-level plans. In the planning flow chart, symbols are used to define as follows:

Table 1 Symbol definition

symbol	definition
	Start/End
	operation
	data
	Decision making

## 4.2 Company level planning

According to the current situation of the company, the plan of each level of the company is sorted out and improved. The first level is the company and plan. The plan improvement process is as follows:

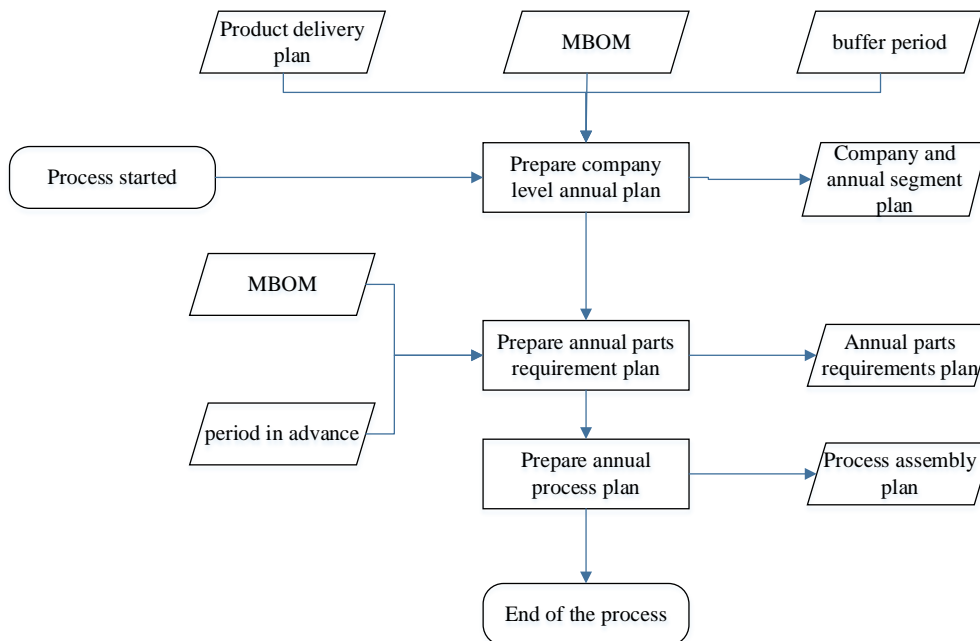


Figure. 3 Company-level plan

## 4.3 Assembly level planning

According to the annual product delivery plan and actual production conditions, and coding in product delivery plan, month production plan and actual production conditions, economic batch group, compiled in paragraph a plan, in paragraph a program, compiled in parts demand plan, demand plan in parts, in security plan, based on assembly level plan by stages.

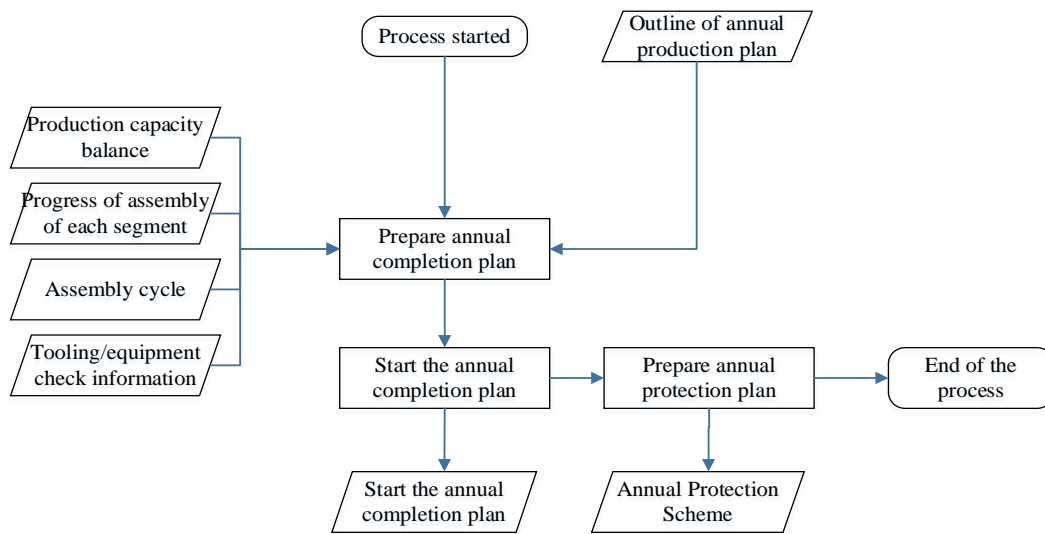


Figure. 4 Assembly-level planning

#### 4.4 Parts-level planning

In the process of making assembly level plan and part level plan, the production plan should be made reasonably according to the constraint theory, and the DBR theory should be used to use pull production mode before the production bottleneck and push production mode after the calm stage.

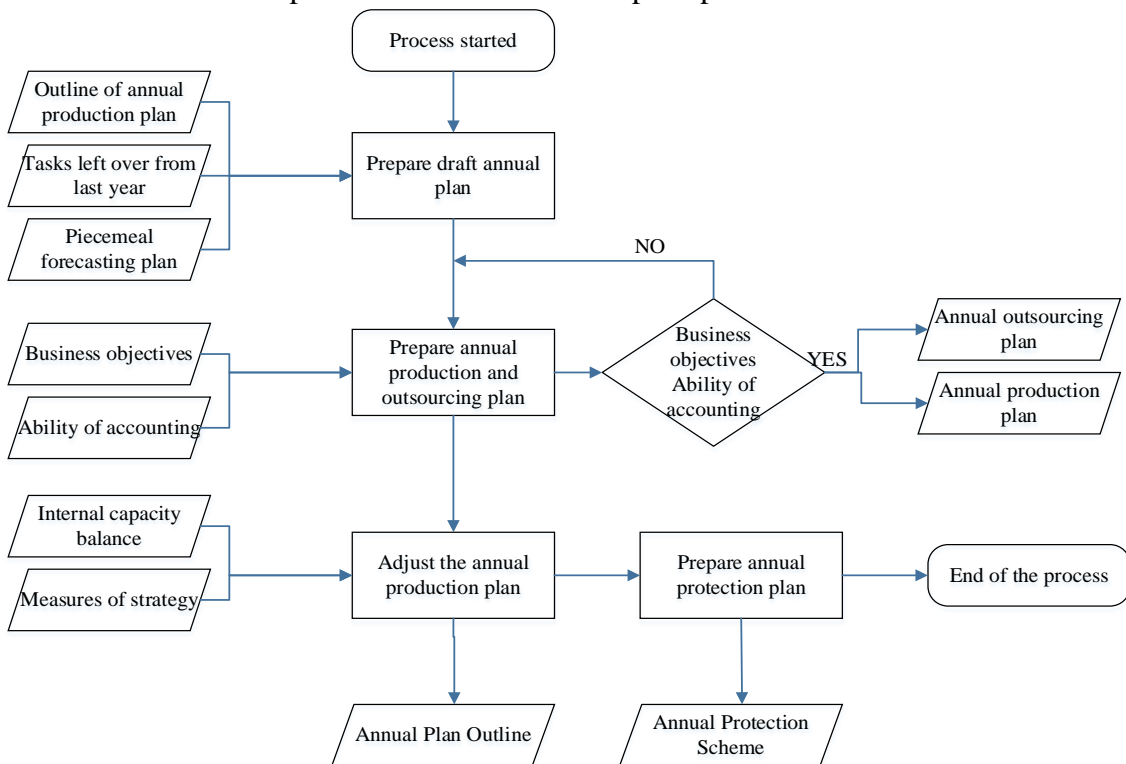


Figure. 5 Parts-level planning

## 5. Conclusion and Prospect

Through the reasonable elaboration production link, and carries on the optimization to each link, thus enhances the overall plan the scientific nature. The plan preparation is basically made according to the internal optimal production batch, and the batch method is determined by each department. It is basically calculated according to experience. Although it avoids multiple production, it is reasonable to some extent, but it causes a serious work-in-process backlog problem. Due to the different size of each specialized factory batch, for the cross-workshop production of parts batch resulting in the impact of uncoordinated production

It also refines the production process so that the plan can be easily monitored in real time. At the same time, adopting the rolling plan preparation method, the production management department prepares the whole machine delivery plan for two years, the first year is the implementation plan, the second year is the expected plan, but the company's monthly plan is not the rolling plan. The monthly plan is divided into March rolling plan and May rolling plan, weekly plan and daily plan are also rolling plan, improve the continuity of the plan.

Improve the systematicness, scientificity and real-time of the plan as a whole, improve the production planning system of C Company, increase C company's adaptability to changes in the plan and external environment, and enhance the anti-risk capability of the planning system.

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