

Discussion on the Application of Effective Management Theory in Commercial Aircraft Project Management

Xia Teng

COMAC Shanghai Aircraft Design and Research Institute, No.5188 Jinke Road, Pudong New Area, Shanghai, China

Email: xiateng@comac.cc

Keywords: Commercial aircraft; Effective management; WBS structure; Considerations

Abstract: Currently, the commercial aircraft development presents the trend of serialization, industrialization, scale and leap, and the project management object changes from single model project to diversified project type. The special work such as production, modification and upgrading of various models is carried out in parallel and continuously deepened, and is continuously extended to downstream products. The traditional project management model has been unable to meet the economic and efficient management needs for commercial aircraft projects. Based on the effective management theory, this work analyzed the main contents and key elements of effective management, and studied the matters needing attention in the effective management of commercial aircraft projects. Accordingly, the WBS effective management decomposition structure was formed, and the specific measures in the project schedule, cost, performance, risk, etc., were deeply explored. The comprehensive optimization of commercial aircraft project management is expected to solve many drawbacks in current commercial aircraft project management to a certain extent.

1. Introduction

Commercial aircraft project management is characterized by complex products, high degree of professional cross, high requirements for dynamic management, and great difference in work content at each stage, etc. It is a highly complex project with regard to technology and management process. Therefore, it is necessary to study the effective management mode of commercial aircraft as soon as possible with the development of commercial aircraft efficiency, and put forward corresponding management strategies and measures. From the perspective of project management, it should promote the main serialization and industrialization development of commercial aircraft and help the project success [1-2]. Different from the traditional project management mode, effective management should not only consider the coordination of resources, but also consider the optimization and coordination of process, organizational structure, management atmosphere, etc. The organization, systematization and scientific management and control of multiple projects should be done well, thus comprehensively promoting the development of commercial aircraft projects and enhancing the market competitiveness of commercial aircraft enterprises.

2. Overview on Effective Management Theory

Peter Drucker is one of the most famous and influential management scientists in the West. He is honored as "the master of masters" and "the father of modern management". Drucker devoted his whole life to teaching, writing and consulting. He had deep research and original views on management philosophy, management principles, management organization, senior management, etc. Among Drucker's many works, "management practice" published in 1954 and "management: task, responsibility and practice" published in 1973 are regarded as the classic works in the field of management. It is these two works that establish Drucker's position as a master of management.

Besides, Drucker's most exciting and attractive work is the effective manager published in 1966. This book has been widely welcomed by managers at all levels since its publication, and has been translated into many languages, which has been widely spread in the world. The "effective

management theory" explained in the book includes that managers must be effective, must learn to manage their own time, must focus on contributions, must pay attention to "strengths", must focus on a few major areas, must make effective decisions, etc., which has laid a solid foundation for the development of effective management [3].

Based on the characteristics of enterprise development, effective management should constantly seek suitable management methods, refine management, and mobilize all positive factors and forces that can be mobilized. Effective management must be carried out closely around the general objectives, adopt appropriate management methods, pay attention to the results, grasp the whole, focus on the key points, and make use of the advantages, thus realizing the maximization of enterprise management benefits.

3. Effective Management Mode for Commercial Aircraft Projects

3.1. Needs analysis

WBS (Work Breakdown Structure) should be carried out on the basis of effective management concept when the effective management of commercial aircraft project is carried out, including all the work determined in the project scope specification, which should be grasped well:

- (1) Work: activities that produce tangible results;
- (2) Decomposition: the process of gradual subdivision;
- (3) Structure: the arrangement of combining parts into a whole according to a certain pattern.

Commercial aircraft project has complex structure and difficult organization and coordination. It is urgent to decompose WBS of effective management in the project management process. Accordingly, a complete project display framework is formed, and project objectives and project nodes are comprehensively grasped to form a systematic, scientific and efficient effective management framework.

3.2. Key content

3.2.1. Input conditions

The input of creating WBS includes project scope specification, requirement document and organization process assets. The scope specification of commercial aircraft project specifically describes the project deliverable, the activities that should be carried out to complete the deliverable, and determines the effectiveness of the project management team to control the whole project scope. Only the requirements that are coordinated, complete, clear, attainable and recognized by major stakeholders can become requirements documents. All assets that affect the success of commercial aircraft projects can be used as organizational process assets, such as policies, procedures and templates used to create WBS, files and lessons learned from previous projects, etc.

3.2.2. Compilation methodology

Generally, WBS preparation methods for commercial aircraft projects include WBS standard, WBS template, bottom-up method, top-down method, etc. Appropriate methods should be selected according to the specific objectives, requirements, assumptions and constraints of the project. The basic steps of common top-down preparation methods are as follows:

First, the final product or service of the project should be defined (i.e., the product or service that needs to be delivered to achieve the success of the project).

Second, the documents related to the scope of the project are carefully studied to ensure that the WBS meets the project requirements.

Third, although the intermediate process itself can not meet the needs of the project, it is also necessary to define the intermediate process and the main deliverable that must be carried out.

Fourth, the main deliverable is decomposed into the lowest level elements (i.e., each independent deliverable at the bottom).

Fifthly, the WBS should be reviewed and improved until it is recognized by the project stakeholders to ensure that the implementation and control of the project can meet the expected

effect.

3.2.3. Decomposition way

The WBS main decomposition methods at all levels of commercial aircraft project are shown in Table 1, which depends on the focus of the project. The project can get different WBS based on different decomposition methods. The choice of decomposition mode is crucial to the formation of WBS. WBS can be compiled according to one or several decomposition modes commonly used in the decomposition of WBS, and appropriate decomposition mode can be used at the corresponding level to facilitate the subsequent project management work [4].

Table 1. WBS decomposition for effective management of commercial aircraft projects

Serial number	Decomposition way	Focus	Advantages	Shortcomings	Examples of decomposition methods
1	By implementation process	Time	Easy to control project schedule and status	Decomposition produces crossover	Spray paint is divided into: polishing, protection, pre-spray preparation, painting, polishing, etc
2	By plane or space	Space	Clear responsibilities, systematicness and integrity	Management duplication is easy to occur	The components are divided into: fuselage, wing, flat tail, vertical tail, rudder, etc
3	By function	Users	Objective clear	Lack of internal deep links	The integrated process design is decomposed into: division of labor instruction, material quota, etc
4	By human resources	Professional sector	Efficient management, clear responsibilities	Lack of overall control over project progress	Part production is divided into: sheet metal factory parts production, machine parts production, compound parts production, etc
5	By subcontracts	Cash flow	Facilitate contract management	Lack of wholeness and systematicness	Tool variety table is decomposed into: purchased tool variety table, self-made tool variety table, etc
6	By resource consumption	Cost	Facilitate cost control	Lack of wholeness and systematicness	The materials on board are divided into: metal materials, standard parts, finished parts, etc
7	By deliverables	Objectives	Facilitate communication and coordination	Incomplete information	The system tests are as follows: gas tank airtight test, control system test, hydraulic brake test, etc

3.2.4. Evaluation principles

The quality of WBS for commercial aircraft projects depends on two basic principles, which should be fully decomposed into detailed levels conducive to effective management. The logical method of hierarchical decomposition varies with different commercial aircraft projects. Responsibilities are allocated at appropriate levels, usually at the underlying elements or major levels. In the evaluation process, the progress, cost, performance and risk can be evaluated according to the specific contents in the work breakdown, thus determining the effectiveness of each deconstruction unit and optimizing the substandard unit.

4. Points for Attention in the Effective Management of Commercial Aircraft Projects

The awareness of "effectiveness" should be rooted in the heart, and the concept of effective management should be run through the commercial aircraft project management, thus enhancing the staff's awareness of effective management. Especially in the process of organization and management, it should pay attention to the establishment of effective incentive and restraint mechanism. In the traditional project management mode, the incentive and restraint mechanism is ignored, and the incentive and constraint are insufficient in the management process. Therefore, in the process of commercial aircraft research and development and production, the rights and obligations of both parties must be constrained through relevant contract terms in an equal contractual relationship, thus forming a high-quality and high-efficiency industrial chain and comprehensively improving the operation efficiency of commercial aircraft projects.

A whole-process management model should be implemented for commercial aircraft

programs. In the traditional commercial aircraft project management mode, the project management unit is often responsible for the main business responsibilities, only through the supervision or related consulting company to manage the project [5]. These are only periodic services, and there is no organization to manage the whole process of the project. Therefore, PM management mode can be adopted to enable technical management personnel to intervene in project management at the project planning stage. In the whole process of the project, relevant units are responsible for the consulting and management work. Based on the internal and external supervision, aircraft research and development and production quality will be comprehensively improved to fundamentally improve the effectiveness of aircraft project management work.

The commercial aircraft project should be managed by all factors. Therefore, the commercial aircraft related enterprises must introduce advanced mode, carry out comprehensive management of WBS elements such as project progress, cost, quality, safety, etc., implement the management responsibility system, and ensure the realization of the full element management mode for commercial aircraft project.

5. Summary

Through the effective management research throughout the whole cycle, the "black box" state of project management is changed. Project managers not only understand the input and output of commercial aircraft projects, but also master the status of the project operation process at any time. It avoids the issue that the deviation can only be found in the final stage of the aircraft project in the past, thus saving the rectification cost of the project. For commercial aircraft project management, WBS is a very important management tool and has important practical value. It lays a common foundation for schedule planning, project budget, cost control, performance management, etc., and it is also convenient for planning management department to estimate the demand of time, cost and resources.

References

- [1] Meredith, J. R., Shafer, S. M., & Mantel Jr, S. J. (2017). *Project Management: A Strategic Managerial Approach*. John Wiley & Sons.
- [2] Fiorini, R. A. (2018). Logic and order: Ontologic effective management for learning and creativity. In *Philosophical Perceptions on Logic and Order* (pp. 283-351). IGI Global.
- [3] Abbasnejad, B., Nepal, M., & Drogemuller, R. (2016). Key enablers for effective management of BIM implementation in construction firms. In *Proceedings of the CIB World Building Congress 2016: Volume I-Creating built environments of new opportunities* (Vol. 1, pp. 622-633). TUT–Tampere University of Technology.
- [4] Owen, J. (2018). *How to Manage: The definitive guide to effective management*. Pearson UK.
- [5] Bang, H., & Midelfart, T. N. (2017). What characterizes effective management teams? A research-based approach. *Consulting Psychology Journal: Practice and Research*, 69(4), 334.