Computer Aided Design and Construction Control of Power Communication System

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Abstract. Power communication engineering is an important project to promote the development of power industry. Due to the rapid development of power communication projects in recent years, the construction data and scale are rising. Therefore, the power communication project puts forward higher requirements for the construction process. Among them, it is required to control the construction progress of the project more effectively. In view of the impact of construction progress control on the construction effectiveness of the project. This paper lists the problems existing in the construction progress control of power communication engineering project, analyzes the main factors affecting its construction progress, and focuses on the effective countermeasures and measures to strengthen the construction progress control effect of power communication engineering project.

Keywords: Power communication engineering, Project construction, Construction progress control, Control measures.

1. Introduction

Power communication engineering project not only has high technical content, but also has great construction risk. Therefore, there are high requirements for the control of the construction process. The content involved in the construction process of such projects is very complex and huge. This adds a lot of difficulty to the construction progress control. In order to complete the construction work on time on the premise of ensuring the construction quality and cost of the power communication project, it is necessary to take more accurate construction progress control measures, accurately analyze the key elements and existing problems affecting the construction progress, and then put forward reasonable countermeasures on this basis, Realize the perfect control of construction quality and construction progress of power communication engineering project.

2. Communication progress control in power project construction

2.1. Incomplete management system

The construction schedule management system of power communication engineering project is usually composed of the management plans of multiple sub projects, such as the use plan of construction funds and construction materials, the construction plan of some projects, the arrangement plan of construction personnel, etc. The management content of the sub project management plan shall include all key links...
of the whole project to ensure the comprehensiveness of the management system, but some construction progress management systems are not considered very comprehensive when they are formulated. For the construction content of some important subprojects, there is no relatively perfect management plan.

2.2. *Unreasonable construction period planning*

The construction period planning of power communication project is determined by the project contract. All construction projects and construction decisions should be implemented in strict accordance with the project contract. However, some project contracts have unreasonable problems in the planning of construction period, which makes it difficult for the construction progress control of power communication projects to play an effective role. There are two main factors causing unreasonable planning of construction period. First, due to the lax construction preparations, the preliminary preparations such as construction survey, construction design and project bidding were not achieved as planned; Second, the project contract failed to fully consider the limitations of various external conditions, such as the capacity of the construction unit, the construction scale of the project, the difficulty of construction technology and site environmental conditions.

2.3. *Relationship between uncoordinated construction progress and cost and quality*

There is a close relationship between the construction progress, construction cost and construction quality of power communication engineering project. Once the relationship between the three is not coordinated, the construction progress of the project should not be effectively controlled. The construction schedule is usually in direct proportion to the construction cost. The higher the construction cost, the faster the construction progress, and the easier it is to ensure the construction quality.

The construction of power information engineering project should pursue comprehensive benefits, and realize the coordination and balance among progress, cost and quality, so as to obtain good construction quality assurance and appropriate construction cost investment on the premise of effectively controlling the construction progress.

2.4. *Construction schedule lacking scientific guidance*

Some power communication engineering projects do not receive scientific guidance when designing the construction schedule, resulting in the lack of predictability and foresight of the construction schedule, which is specifically reflected in the unreasonable situation in the construction process arrangement, construction time estimation, construction structure decomposition and other work, so that the project construction fails to reasonably arrange the use of construction resources. Foresight and foresight are very important for the construction schedule, which will have a great impact on the overall construction progress. The lack of foresight and forward-looking construction schedule will lead to many omission problems in the construction process, especially in case of some sudden construction problems, there is no corresponding emergency response plan.

3. *Main factors affecting construction progress control of power communication project*

3.1. *Construction material factors*

To ensure the construction quality of power communication projects, we must use reliable construction materials. Therefore, the project management personnel shall strengthen the quality control of construction materials. First of all, the first pass of material receiving shall be well controlled. The appearance, performance and other quality indexes of materials must comply with the national standards. Construction materials that do not meet the quality standards shall not be accepted. Secondly, the construction materials shall be well preserved after receiving. During the preservation of construction materials, they are vulnerable to quality problems caused by environmental conditions.
3.2. Construction personnel factors
Construction personnel are the implementers of power communication engineering projects and an important factor to ensure the quality of engineering construction. When controlling the construction progress of power communication engineering project, we should first do a good job in the mobilization of construction personnel, mainly to mobilize the work enthusiasm of construction personnel and improve the sense of responsibility of construction personnel for project construction. Therefore, the construction enterprise shall create good construction conditions for the construction personnel, formulate a reasonable construction reward and punishment system according to the actual construction situation, and encourage the construction personnel to strive to improve their work performance. Secondly, relevant construction enterprises should carry out professional training for personnel involved in construction, so as to give full play to the labor force of construction personnel. The construction management personnel shall arrange the most suitable jobs for the construction personnel according to their technical ability.

3.3. Construction environmental factors
The actual construction points of power communication engineering are usually many, and its construction fluidity is large. Different construction sites have different construction environments. The construction environment has a great impact on the actual construction effect. This is because many construction processes and technologies have more requirements for the construction environment. If the construction environmental conditions fail to meet the standards, some construction operations cannot even be carried out. In addition, due to the consideration of environmental protection, the construction of power communication engineering projects is often subject to more restrictions, which cannot have too much impact or damage on the surrounding environment, resulting in the slowdown of construction progress to a certain extent.

4. Empirical case analysis
Mainly through the system communication project of IOKV avente Road 1 and 2 of a power supply company, this paper expounds the basic situation of power communication project construction, including project scale and project quantities. According to the schedule control model in Chapter 4, this paper makes an empirical analysis on the schedule control of the system communication project of IOKV avente No. 1 and No. 2 Road of a power supply company.

Table 1. Breakdown of main quantities of the project

| Name of replacement equipment                                      | Quantity | Duration (days) |
|--------------------------------------------------------------------|----------|-----------------|
| Newly installed DTU                                               | 3 sides  | 3               |
| Install a new adapter housing                                      | 2 seats  | 2               |
| Add two additive zero sequence current transformers                | 18 sets  | 3               |
| Switch electric operating mechanism                                | 18 sets  | 3               |
| Load switch auxiliary node, Auxiliary node of grounding switch     | 36 each  | 6               |
| Remote local auxiliary switch                                      | 18 each  | 5               |
| Tripping and closing button and indicator light                    | 36 each  | 3               |
| Control line ZRC-KVVP2-22A-10x2.5                                  | 270 meters | 3       |
| Control line ZRC-KVVP2-22A-7x2.5                                   | 720 meters | 15      |
| Moving cable ZRC-YJY22-3X10                                       | 330 meters | 8        |
| 48 core non-metallic pipeline optical cable                        | 750 meters | 18      |
| Flame retardant sub pipe                                          | 750 meters | 18      |
| Optical network unit (ONU)                                         | 4 sets   | 1               |
| ODN                                                                | 8 sets   | 2               |
| Indoor integrated communication cabinet                             | 3 sets   | 1               |
5. Measures to improve the construction progress control effect of power communication engineering

5.1. Strengthen construction organization and management
High technical content, complex construction and high construction risk coefficient are the invariable characteristics of power communication project construction. Therefore, it is necessary to ensure the professionalism and organization of its construction unit, carry out a series of professional training and assessment for the construction personnel, improve the professional ability and safe construction awareness of the construction personnel, ensure that the construction personnel can correctly and skillfully use the professional construction equipment and technology, and ensure that each construction personnel must work with certificates. The construction management personnel shall give full play to the management efficiency of the organizational structure, make the best use of people and make the best use of people, so that the whole construction organization can carry out the project construction step by step. Due to the complexity of power communication engineering construction, construction conflicts often occur among construction departments. Therefore, it is necessary to establish a scientific and effective construction organization and coordination mechanism in advance to coordinate various construction problems in time, such as holding regular coordination meetings within the organization, enhancing the communication between various departments, and summarizing and deploying the construction work regularly. In addition, the construction organization shall also coordinate with other external institutions, such as material suppliers and government departments, to effectively coordinate construction materials, construction conditions and relevant construction procedures.

5.2. Strengthen the control of construction quality elements
Construction quality problems not only directly affect the construction progress of power communication project, but also affect the service life and comprehensive benefits of the project. Therefore, it is necessary to strictly control various elements of construction quality in power communication engineering projects. For example, strict quality inspection shall be carried out on construction materials according to clear quality standards, and problematic construction materials shall be found in time to prevent unqualified construction materials from reducing construction quality and polluting the construction environment; The management personnel shall supervise whether the construction personnel carry out construction operations according to the established quality policies and requirements; For special technical workers such as welding and crimping, they must hold relevant valid certificates before they are allowed to work; The construction personnel shall strengthen their study before taking the post, master the relevant technologies and knowledge required by the project construction, and do a good job of self-inspection after the construction; During the construction process, strengthen the construction responsibility system, make various construction records, and find construction problems that can be documented.

5.3. Strengthen the control of construction cost
In order to improve the construction progress control effect of power communication engineering project, the first thing to strengthen control is the construction cost. The control principle of construction cost is to effectively control project expenditure and budget, make rational use of construction funds, and reduce cost overrun and fund gap. Therefore, construction enterprises should make full use of new processes and technologies to improve construction efficiency. Strengthen the management of construction personnel and reduce unnecessary labor costs. The construction materials shall be supplied by quota, the accounting of material consumption shall be strengthened, and the construction materials with good quality and low cost shall be selected. At the same time, the quality supervision of project construction shall be done well to avoid project cost overrun due to rework.
5.4. Strengthen construction risk control

The construction of power communication engineering project is dynamic and complex, involving more professional construction, so it is easy to produce more construction risks and affect the construction progress of the project. Therefore, it is necessary to do a good job in the management and control of construction risks. First of all, it is necessary to strengthen the risk control of the construction contract, clarify the provisions of the contract on the responsibilities of all parties, and reasonably specify the payment method of project funds. Secondly, we should strengthen the control of safe construction. Relevant management departments shall manage the construction safety in a scientific way, implement the specific responsible persons for each construction, strengthen the construction safety training for construction personnel, strictly implement the national safety construction standards during the construction process, improve and adopt qualified safety protection equipment and measures. Third, we should strengthen the investigation of potential construction safety hazards and strengthen the supervision of weak safety links.

6. Conclusion

The construction of power communication engineering is of great significance to the development and progress of national power engineering. Such engineering projects not only have high economic benefits, but also have important social benefits. While pursuing the construction quality of power communication engineering project, we should pay more attention to the control of its construction progress, so as to effectively ensure that the construction cost and construction quality of power communication engineering are in a good balance and maximize the comprehensive benefits.

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