Scientific Research Publishing

Voice of the Publisher, 2024, 10, 83-89
https://www.scirp.org/journal/vp
ISSN Online: 2380-7598
ISSN Print: 2380-7571

Research on Construction Technology of Communication Mechanical and Electrical Engineering

Tong Zhang[1,2], Hao Wu[3], Xin Chen[4]

[1]School of Energy and Power Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China
[2]CATARC Automotive Technology (Shanghai) Co., Ltd., Shanghai, China
[3]Wuhan Maritime Communication Research Institute, Wuhan, China
[4]Independent Researcher, Shanghai, China
Email: tongzhang_zt@163.com

How to cite this paper: Zhang, T., Wu, H., & Chen, X. (2024). Research on Construction Technology of Communication Mechanical and Electrical Engineering. *Voice of the Publisher, 10,* 83-89.
https://doi.org/10.4236/vp.2024.101007

Received: February 29, 2024
Accepted: March 26, 2024
Published: March 29, 2024

Abstract

Research on Construction Technology of Communication Mechanical and Electrical Engineering Today, with the accelerated development of communication engineering, the mechanical and electrical industry, as an important pillar industry of the national economy, has rapidly developed, laying a good foundation for the construction of mechanical and electrical engineering. In this context, the quality control of mechanical and electrical engineering construction has become an urgent task, and it is necessary to strengthen the unified management of mechanical and electrical equipment to ensure the installation and overall quality of mechanical and electrical equipment. The article starts with the entire process of mechanical and electrical engineering construction, analyzes in detail the factors that affect the quality of mechanical and electrical engineering construction, and proposes specific quality control methods, hoping to provide some reference for the quality management of communication mechanical and electrical engineering construction.

Keywords

Communication, Mechanical and Electrical Engineering, Construction Technology, Proposal

1. Introduction

The times are constantly advancing, and the communication industry can only stand firm in the current economic system by keeping up with the pace of the times. Mechanical and electrical engineering is not only a crucial part of the en-

tire communication engineering construction process, but also a very core and important component. To avoid being eliminated from the current intensified competition, communication construction enterprises must also do a good job in construction quality management, continuously enhance their strength, and improve the quality of construction services.

2. The Importance of Installing Communication Electromechanical Equipment

Currently, influenced by the development of science and technology, communication engineering is moving towards intelligence (Li, 2021; ElMenshawy, Helmy, & El-Tazi, 2019). In communication engineering, there are many advanced electromechanical equipment, and the quality requirements for installation and construction are quite strict. There are clear requirements for the circuit path, installation position, and fixing form of electromechanical equipment. Promote the installation technology and quality management of electromechanical equipment. The installation of electromechanical equipment has a certain degree of comprehensiveness. There are many construction contents in communication electromechanical engineering, mainly involving many different types of technologies. The construction characteristics of each system have certain differences, and the actual construction points are also different (Jeong et al., 2022; Li et al., 2021). Before carrying out construction work, relevant personnel should conduct on-site surveys, improve and optimize construction plans, and further ensure the smooth progress of mechanical and electrical installation construction. The installation and construction environment of mechanical and electrical equipment is relatively complex, often with multiple systems in the same space, and the distance between the mechanical and electrical equipment of each system is relatively close. This not only increases the difficulty of construction but also interferes with each other between the mechanical and electrical equipment and pipelines. Therefore, in the construction process of mechanical and electrical equipment, according to the characteristics and attributes of the system, scientifically and reasonably understand the distance between pipelines and equipment to ensure the completeness of the functions of mechanical and electrical equipment (Ma et al., 2023; Pooley et al., 2023).

3. Construction Technology of Communication Electromechanical Engineering

3.1. Ventilation System Installation and Construction Technology

The ventilation system can effectively improve the internal environment of communication equipment, and maintain the comfort and rationality of the internal environment of communication equipment. A good environment can maintain the scientificity of work and learning. Therefore, the ventilation system in communication electromechanical installation has always received high attention. It is necessary to ensure the rationality of the ventilation system installa-

tion. The installation of ventilation systems is quite complex, including the installation of air ducts, exhaust systems, and dust removal systems (Chletsou et al., 2022; Lavalle et al., 2022). Different equipment plays different roles, so it is necessary to constantly monitor the installation process of the equipment during the installation process to fully utilize its application functions. Before installing the equipment, it is necessary to analyze the installation requirements, locate the equipment, and reduce the difficulty of installation. Secondly, during the installation process, it is necessary to strengthen the analysis of the design scheme, ensure that the installation position is consistent with the design scheme, and implement scientific dust removal measures to prevent excessive dust from affecting the installation effect. Finally, during the installation process of the ventilation system, due to the presence of a large number of concealed engineering projects and the irreversible nature of the installation process, it is necessary to strengthen the analysis of maintenance and repair during installation, reserve more space, and lay a solid foundation for subsequent construction and maintenance (Ishchenko, 2020; Senchenko et al., 2020). The ventilation system plays a crucial role, and to meet installation requirements, it is necessary to strengthen the optimization selection of processes, materials, and personnel.

3.2. Information Modeling Technology for Communication Electromechanical Engineering

Mechanical and electrical engineering information modeling, also known as BIM technology, can be applied to communication project construction engineering to simulate and model communication engineering (Ghaffarpasand & Pope, 2024; Kim, Singh, & Jung, 2024). Based on communication engineering data, three-dimensional or three-dimensional modeling can be formed to reflect the real situation that occurs during the construction process of communication engineering. Firstly, construct a good project information model while also conducting appropriate testing. Generally speaking, when completing the construction of three-dimensional pipelines, it is necessary to optimize the design scheme. The main purpose of optimization is to ensure the feasibility and authenticity of project parameter content, laying a solid technical foundation for further production of three-dimensional simulation models and other engineering projects. However, if a more severe accident occurs during the construction process, the staff must inspect the data and statistical analysis before adjusting the engineering model, Once problems arise during construction, modeling data analysis can be used to quickly identify solutions, accelerate project progress, and increase economic efficiency (Shrahily et al., 2022; Liu, 2021). Secondly, complete the parameter correction task. The mechanical construction of communication engineering inevitably requires corresponding adjustments to the pipeline. During the process of adjusting the pipeline, the line head of the pipeline will change, resulting in faults at the end of the pipeline. This will hurt the overall construction quality of the engineering machinery, greatly reducing the accuracy of mechanical operation. However, if BIM technology is used to correct

basic parameters, It can greatly improve the accuracy of data analysis and also select the correct mechanical equipment according to the analysis results (Szymkowicz et al., 2023; Yang et al., 2022). Thirdly, materials and costs. Engineering cost management can also be achieved through the application of BIM technology, transmitting all data content in the project construction process to the BIM management system (Park et al., 2024; Thangavel, Memedi & Hedström, 2024). Through the corresponding construction manager, all materials, facilities, and other contents included in the project construction can be directly managed. At the same time, historical data in the BIM management system can be used to analyze all content such as supplementary time, to achieve reasonable control of project construction costs (Liu, 2023; Azubuike & Princewill-Nwaduwa, 2022).

4. Optimization Strategy for Quality Management of Communication Electromechanical Engineering Equipment Installation

4.1. Strengthen the Quality Acceptance Work of Engineering Construction

Communication electromechanical engineering is a highly comprehensive and highly comprehensive project that requires high professionalism from construction personnel. At the same time, due to certain safety hazards in mechanical and electrical equipment, corresponding protective measures should be taken during the completion and acceptance of the project to ensure the normal operation of the equipment and prevent safety accidents. In the acceptance stage, video data should be saved for each process that may be hidden in the later stage. Quality inspectors should conduct a self inspection of each construction process and make self-inspection records. The supervising engineer should go to the site for concealed acceptance, and subsequent operations can only be carried out after being inspected and verified by the supervisor. During the entire construction period, the quality inspector exercises the right of veto over the quality, and any non-conforming processes must be reworked before proceeding to the next step of construction. In the acceptance of communication electromechanical projects, the principle of quality first should be adhered to, and construction drawings, construction quality, and progress should be carefully analyzed to reduce quality problems and economic losses.

4.2. Strengthen Technical Training and Improve the Technical Level of Construction Personnel

Construction technicians are the executors of communication engineering and mechanical and electrical construction. Improving the technical level of construction personnel through training can improve the quality level of building engineering mechanical and electrical construction. During the training process, relevant training should be provided to construction technicians on construction

methods, key technical points, and prone to problem areas. As the assembly volume of large precision instruments and equipment increases during construction, targeted training should also be provided as needed. A skilled construction team can not only improve the construction efficiency of communication electromechanical engineering in construction, but also reduce unnecessary errors during construction, reduce equipment usage losses, promptly solve small problems during construction, reduce equipment maintenance waste time, ensure project quality, reduce construction costs of communication electromechanical engineering, increase economic benefits, and enhance enterprise competitiveness. Training can also enhance the overall understanding of the construction process among engineering and technical personnel, fully mobilize their subjective initiative to actively engage in the production and construction of mechanical and electrical equipment, stimulate their creativity in construction activities, provide innovative vitality for the construction of communication and mechanical engineering enterprises, and promote the continuous development of the company. Communication electromechanical engineering is a complex work with multiple trades and processes. Construction personnel should understand the quality control points of each construction step, attach importance to management work in electromechanical engineering construction, and strengthen technical training. At the same time, cooperate with the quality control measures of each stage of construction, do a good job in the phased disclosure work of construction, achieve perfect docking in the construction project, pay attention to the coordination of various links in construction, and reduce various hidden dangers in construction. During construction, technical personnel should be encouraged to research and try out new technologies, but in the process of innovation, relevant technical support must be provided and comply with relevant policies, regulations, and standards.

5. Conclusion

In summary, communication electromechanical engineering is an important type of engineering project. In the development of this field, the application fields of communication electromechanical engineering are more extensive and demonstrate strong effectiveness. At the same time, various sectors have put forward higher requirements for the installation quality of electromechanical equipment. Building high-quality electromechanical projects has become the primary task for enterprises. In the installation and construction process of mechanical and electrical engineering equipment, enterprises should strengthen construction management, take quality improvement as the guide, continuously strengthen supervision, comprehensively eliminate various quality risks, promote the improvement of the installation quality of mechanical and electrical engineering equipment, meet the production and development needs of various industries with high-quality mechanical and electrical projects, and provide continuous power for the stable progress of enterprises.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Azubuike, C., & Princewill-Nwaduwa, B. (2022). Role of Communication and Language in Building Capacity for Different Sectors of the Nigeria Economy: Study of Media Sub-Sector. *Asian Journal of Education and Social Studies, 37,* 35-43. https://doi.org/10.9734/ajess/2022/v37i4808

Chletsou, A., Locke, J. F., & Papapolymerou, J. (2022). Effects of Plastic Vehicular Covers on Radiation Characteristics of Lightweight, Dual-Band Antenna for Vehicular Communications. *The Journal of Engineering, 2022,* 1017-1031. https://doi.org/10.1049/tje2.12192

ElMenshawy, D., Helmy, W., & El-Tazi, N. (2019). A Clustering Based Approach for Contextual Anomaly Detection in Internet of Things. *Journal of Computer Science, 15,* 1195-1202. https://doi.org/10.3844/jcssp.2019.1195.1202

Ghaffarpasand, O., & Pope, F. D. (2024). Telematics Data for Geospatial and Temporal Mapping of Urban Mobility: New Insights into Travel Characteristics and Vehicle Specific Power. *Journal of Transport Geography, 115,* Article 103815. https://doi.org/10.1016/j.jtrangeo.2024.103815

Ishchenko, A. (2020). Simulation Model of the Communication Repair Process in the Mechanized Brigade Repair Unit. *Journal of Scientific Papers Social Development Security, 10,* 56-66. https://doi.org/10.33445/sds.2020.10.1.7

Jeong, H., Park, E., Phon, R., & Lim, S. (2022). Mechatronic Reconfigurable Intelligent-Surface-Driven Indoor Fifth-Generation Wireless Communication. *Advanced Intelligent Systems, 4,* Article 2200185. https://doi.org/10.1002/aisy.202200185

Kim, T.-M., Singh, P., & Jung, S.-Y. (2024). Performance Evaluation of Data Embedding Schemes for Two-Dimensional Display Field Communication. *Optics Express, 32,* 4668-4683. https://doi.org/10.1364/OE.515565

Lavalle, C., Magnocavallo, M., Bernardini, A., Vetta, G., Bianchi, V. et al. (2022). A Mobile App for Improving the Compliance with Remote Management of Patients with Cardiac Implantable Devices: A Multicenter Evaluation in Clinical Practice. *Journal of Interventional Cardiac Electrophysiology: An International Journal of Arrhythmias and Pacing, 64,* 257-264. https://doi.org/10.1007/s10840-022-01207-y

Li, D. (2021). Speech Fault Recognition Method of Music Intelligent Player Based on Communication Feature Analysis. *International Journal of Speech Technology,* 1-8. https://doi.org/10.1007/s10772-021-09889-x

Li, Y., Huang, K., Zhu, X., & Lu, K. (2021). Application of Internet Communications in Agricultural Electromechanical Drainage and Irrigation Pumping Station. *Journal of Physics: Conference Series, 1732,* Article 012010. https://doi.org/10.1088/1742-6596/1732/1/012010

Liu, C. (2023). Construction of Public Security Rapid Response Communication and Command System Based on Spatiotemporal Big Data. *Advances in Computer, Signals and Systems, 7,* 45-53.

Liu, H. (2021). Computer Aided Design and Construction Control of Power Communication System. *Journal of Physics: Conference Series, 2033,* Article 012160. https://doi.org/10.1088/1742-6596/2033/1/012160

Ma, J., Choi, J., Park, S., Kong, I., Kim, D., Lee, C., & Kim, W. (2023). Liquid Crystals for

Advanced Smart Devices with Microwave and Millimeter-Wave Applications: Recent Progress for Next-Generation Communications (Adv. Mater. 45/2023). *Advanced Materials, 35,* Article 2370327. https://doi.org/10.1002/adma.202370327

Park, S., Lee, H., Cho, W., Woo, H. G., Lim, H., Kim, S., & Yon, D. K. (2024). Efficacy of Information and Communication Technology Interventions for the Management of Diabetes Mellitus: An Umbrella Review and Evidence Map. *Obesity Reviews,* e13714. https://doi.org/10.1111/obr.13714

Pooley, A. C., May, A., & Mitchell, V. (2023). Furthering the Development of Virtual Agents and Communication Robot Devices through the Consideration of the Temporal Home. *Multimodal Technologies and Interaction, 7,* Article 104. https://doi.org/10.3390/mti7110104

Senchenko, V., Kaverzneva, T., Skripnik, I., & Idrisova, J. (2020). Optimal Location of Communication Lines and Power Lines on Common Support. *Investigacion Operacional, 41,* 188-199.

Shrahily, R., Medjdoub, B., Klalib, H., Chalal, M., & Alwetaishi, M. (2022). Managing Construction Site Communication Using the Responsibility Assignment Matrix (RAM) System. *International Journal of Construction Management, 22,* 2966-2986. https://doi.org/10.1080/15623599.2020.1837717

Szymkowicz, E., Bodet-Contentin, L., Marechal, Y., & Ehrmann, S. (2023). Comparison of Communication Interfaces for Mechanically Ventilated Patients in Intensive Care. *Intensive Critical Care Nursing, 80,* Article 103562. https://doi.org/10.1016/j.iccn.2023.103562

Thangavel, G., Memedi, M., & Hedström, K. (2024). Information and Communication Technology for Managing Social Isolation and Loneliness among People Living with Parkinson Disease: Qualitative Study of Barriers and Facilitators. *Journal of Medical Internet Research, 26,* e48175. https://doi.org/10.2196/48175

Yang, Y., Yang, Y., Li, X., & Hua, C. (2022). Adaptive Synchronization Control of Multi-manipulator Teleoperation System under Constrained Discrete-Time Network Communication. *International Journal of Robust and Nonlinear Control, 33,* 1807-1820. https://doi.org/10.1002/rnc.6466