



Problems and Measures in the Construction Management Process of Landscape Engineering

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DOI: 10.32629/aes.v4i2.1230

Abstract: Landscape engineering is an important component of modern urban and rural planning. It not only provides a place for urban residents to relax and rejuvenate but also plays a vital role in balancing the ecological environment through the use of plants. In summary, landscape engineering can improve the appearance of urban and rural areas and enhance the quality of life for urban residents. Construction management is an indispensable part of landscape construction planning. However, the construction management process of landscape engineering is complex and significant, and it encounters several problems. Therefore, it is of practical significance to analyze the problems and propose corresponding solutions in the process of construction management of landscape engineering. This paper aims to explore the problems in the construction management process of landscape engineering and propose relevant measures. Firstly, it analyzes issues such as varying qualifications of construction personnel, lack of on-site coordination, inadequate quality control, and delays in construction progress. Subsequently, it suggests measures such as establishing sound management systems, optimizing construction organization, strengthening quality management, and enhancing personnel training. The paper emphasizes that only by strengthening management from multiple aspects can the smooth progress of landscape engineering construction be ensured and public interests be safeguarded. Therefore, this paper discusses the problems and solutions in the construction management process of landscape engineering, which has both theoretical and practical significance for the research on construction management of landscape engineering.

Keywords: landscape engineering, construction management, problems, measures

1. Importance of Construction Management in Landscape Engineering

1.1 Enhancing Construction Quality

Construction management in landscape engineering refers to the effective coordination and management of various aspects during the construction process to ensure that requirements regarding project quality, safety, and progress are met. Construction quality is of utmost importance throughout the construction phases, and through effective management, it is possible to control the quality of each stage, avoid construction quality issues, and ensure a stable and reliable construction quality. The importance of improving construction quality in landscape engineering construction process is evident in the following aspects.

(1) Enhancing landscape aesthetics. The construction quality of landscape engineering is a crucial support for ensuring the quality of the landscape aesthetics. Only by ensuring construction quality can the landscape exhibit beautiful, neat, and visually appealing effects, thereby enhancing the overall quality and level of the landscape. (2) Extending the lifespan of landscape engineering. The quality of construction directly affects the lifespan of landscape engineering. High-quality construction techniques and materials guarantee the long-term use of landscape engineering, reduce the frequency of maintenance and repairs, and extend the lifespan of the landscape engineering. (3) Reducing long-term maintenance costs: Good construction quality can minimize the long-term maintenance costs of landscape engineering. With excellent construction quality, issues such as damages, aging, and deterioration can be minimized, thus reducing the costs associated with maintenance and replacements in the future. (4) Maintaining brand image. High-quality construction in landscape engineering enhances the reputation, visibility, brand image, and competitiveness of the company in the landscape industry, promoting the sustainable development of landscape engineering. This holds significant importance for the long-term growth of landscape enterprises.

Therefore, improving construction quality in landscape engineering is of great significance for aspects such as landscape aesthetics, lifespan of landscape engineering, user satisfaction, long-term maintenance costs, and brand image.

1.2 Controlling Construction Schedule

Controlling the construction schedule in landscape engineering is crucial to ensure that the project progresses smoothly

and is completed on time, meeting the quality standards. The importance of controlling the construction schedule in landscape engineering construction process is evident in the following aspects.

(1) Ensuring project quality. A well-planned construction schedule allows the construction process to proceed according to the planned and design requirements, avoiding issues that may arise from an unreasonable construction schedule and ensuring project quality. (2) Reducing project duration and costs. Controlling the construction schedule helps in reducing the project duration and construction costs, improving project efficiency, and lowering investment, management, and operational costs. (3) Avoiding contractual liabilities. Completing the project within the specified timeframe as per the construction contract helps in avoiding contractual liabilities and compensation issues that may arise due to construction schedule delays. (4) Ensuring safety in production. A reasonable construction schedule prevents safety accidents caused by time constraints and excessive schedule pressure during the construction process, ensuring the personal and property safety of workers. (5) Maintaining project image. A well-controlled construction schedule ensures the predictability and controllability of the project's progress, maintaining the project's image and reputation, and enhancing its market competitiveness.

Therefore, controlling the construction schedule in landscape engineering is of great significance in ensuring project quality, reducing project duration and costs, avoiding contractual liabilities, ensuring safety in production, and maintaining project image.

1.3 Reducing Construction Costs

The importance of reducing construction costs in landscape engineering can be summarized in the following points.

(1) Increasing profitability. Reducing construction costs in landscape engineering allows for increased profitability and lower production costs, thereby enhancing the competitiveness of businesses. (2) Enhancing competitiveness. Lowering construction costs in landscape engineering reduces investment, management, and operational costs, enabling companies to offer lower bids while maintaining the same level of project quality and services, thus enhancing their competitiveness. (3) Improving industry development. Lowering construction costs in landscape engineering contributes to the overall development and standardization of the landscape and greening industry. (4) Increasing social benefits. Reducing construction costs in landscape engineering leads to increased coverage and quality of landscape greening, improving environmental quality and enhancing the living environment for urban residents. (5) Promoting sustainable development. Lowering construction costs in landscape engineering promotes sustainable development by adopting energy-efficient and environmentally friendly materials and technologies, reducing resource and energy consumption, and minimizing negative environmental impacts.

In conclusion, the importance of reducing construction costs in landscape engineering lies in increasing profitability, enhancing competitiveness, improving industry development, increasing social benefits, and promoting sustainable development.

2. Analysis of the Characteristics of Landscape Engineering Construction

2.1 Diversity of Construction Conditions

Landscape engineering encompasses a wide range of project types, including planting, earthworks, greening, and landscaping. Therefore, different types of landscape projects require different construction methods and techniques based on the construction environment, each with varying levels of difficulty and requirements. Different terrain conditions, such as mountainous areas, plains, and waterfront areas, will have different impacts on construction, necessitating the use of different construction techniques and tools. The type, structure, and quality of the soil also influence the construction process. For instance, construction in areas with hard rocks may require blasting techniques, while areas with soft soil may require special foundation treatment measures. Climate conditions are also crucial factors influencing landscape engineering construction. For example, in high-temperature summers or tropical regions with lower latitudes, measures to prevent heatstroke among workers may be necessary, while waterproofing measures are required during the wet or rainy seasons. When conducting landscape engineering construction around buildings, the surrounding environment, such as noise, vibration, and radiation, needs to be taken into consideration. Therefore, the diversity of construction conditions in landscape engineering necessitates the use of different construction methods, techniques, and precautionary measures depending on factors such as terrain, soil, climate, and surrounding environment.

2.2 Complexity of Construction Environment

The construction of landscape projects often takes place in various complex environments, including parks, urban squares, and highway green belts, where environmental factors have a significant impact on construction. Different environmental and climatic conditions require specific construction measures. Various tools and facilities, such as excavators,

cranes, and cement mixers, are employed in landscape construction, and their diversity and complexity necessitate specialized skills and experience for their operation. The construction processes involved in landscape projects are also highly intricate, requiring adherence to specific procedures and requirements. Soil treatment, plant cultivation, water system construction, and other tasks must comply with strict construction standards and technical specifications. Landscape construction typically takes place in public spaces or ecological environments, which adds to the complexity of the construction environment. Safety hazards are present throughout the construction process, including traffic conditions, work at heights, and blasting operations. Therefore, a series of safety measures must be implemented to prevent accidents and ensure the well-being of workers. Additionally, the prevention of environmental and personnel damage resulting from unforeseen accidents is of utmost importance. In summary, the construction environment of landscape projects is highly complex, necessitating the involvement of professional teams and management expertise to ensure smooth construction progress and meet quality standards.

2.3 Long-term Nature of Construction Maintenance

Landscape construction projects often need to consider the future landscape effects and maintenance, requiring the consideration of long-term factors during the construction process, including plant growth, soil moisture, and maintenance issues. The construction and maintenance of landscape projects are long-term processes that require continuous investment of time, manpower, and resources. In terms of construction, extensive time and effort are required for planning, designing, constructing, and debugging landscape projects. Additionally, the construction of landscape projects needs to take into account factors such as environmental protection and ecological balance, which require long-term and sustained investment.

In terms of maintenance, landscape projects require regular care and management. This includes maintenance and updating of landscape facilities, pruning and renewal of green plants, as well as maintenance of landscape lighting and fountains. Furthermore, various tasks such as cleaning, sanitation, pest control, and safety inspections need to be carried out in the park, requiring long-term investment and maintenance. Additionally, specific management and maintenance practices are required based on different seasons and climatic conditions, such as fire prevention and heat protection in summer, and prevention of frost damage in winter.

2.4 Aesthetic Appeal of Landscape Effects

The aesthetic appeal of landscape effects in landscape construction refers to the creation of beautiful, comfortable, and harmonious natural environments through landscape design and construction techniques. Landscape construction considers the aesthetic effects, satisfying the aesthetic needs of users and the environment. Through greening and landscape shaping, it enhances the urban image and ecological environment. The aesthetic appeal of landscape effects depends on multiple factors, including design, material selection, plant cultivation, and construction techniques.

The aesthetic appeal of landscape effects in landscape construction is the result of multiple factors working together. The rationality of planning and design schemes, selection and application of materials, arrangement and maintenance of vegetation, and the proficiency of construction techniques are all crucial factors. Only when all aspects are coordinated and aligned can satisfying landscape greening effects be achieved.

3. The Problems in Landscape Construction Management

3.1 Varying Qualifications of Construction Personnel

Currently, the qualifications of landscape construction personnel vary greatly, and this situation is caused by various factors. Firstly, landscape construction personnel often have a low level of education, lacking the necessary professional theoretical knowledge and skills, as well as practical experience. They have not received sufficient training to perform their work competently. Secondly, the lack of industry standards contributes to the inconsistency in the qualifications and skill levels of landscape construction personnel. In some regions, the landscape industry may lack unified industry norms and standards, leading to issues such as low technical content, low labor efficiency, and inconsistent quality. Lastly, inadequate management is another contributing factor. Without proper management, landscape construction personnel may develop poor work habits and behaviors. Poorly managed construction sites can lead to disorganized construction processes, cluttered tools, and other issues that affect the qualifications and service levels of construction personnel. The qualifications of construction personnel have a significant impact on the construction quality and safety of landscape projects. Insufficient qualifications can result in substandard project quality or safety accidents.

3.2 Unreasonable Planning and Design

The planning and design of landscape projects are highly complex processes involving various considerations such as

landscape planning, plant arrangement, material selection, and environmental conditions. In landscape construction, there may be cases where planning and design are not reasonable, which can reduce construction quality and ultimately impact the aesthetic appeal and functionality of the entire landscape. Currently, the problem of unreasonable planning and design is prominent in landscape construction management. Design and planning personnel may have a low level of professional expertise, focusing more on theory than practice. Some may even have switched careers and lack familiarity with construction sites and processes. Design work and drawing reviews may be rushed and superficial, and some design firms may lack professional qualifications. Poor coordination between construction contractors and design firms makes it difficult to achieve the desired construction results. Unreasonable planning and design can lead to various issues, including space wastage, resource waste, and economic losses; lack of stylistic coherence, affecting the overall aesthetic and coordination of the landscape; improper plant arrangement, resulting in unfavorable growth conditions and occurrence of plant diseases and pests; construction delays, increased project costs and risks; and safety hazards such as unstable building structures and poorly designed roads. Therefore, it is important to pay attention to the rationality of planning and design in landscape construction, considering multiple aspects and ensuring smooth project implementation to achieve excellent results and meet the intended objectives.

3.3 Quality issues may arise during the construction process

Quality issues during the landscape construction process can arise in various aspects, including design, materials, construction, management, and environmental factors.

In terms of design, detailed and appropriate design plans are essential for landscape construction. If the design is flawed or inadequate, it can lead to quality issues during the construction process, such as improper earthwork excavation or unsuitable plant selection. Regarding materials, a wide range of materials is required for landscape construction. If low-quality or non-compliant materials are used, it can negatively impact the construction quality. Examples include poor-quality plant seedlings or improper use of construction materials. Concerning construction, attention to detail is crucial. If construction practices are not standardized or carried out properly, deviating from the established construction procedures and standards, it can affect the overall quality. Examples include improper construction sequencing, inappropriate tools, non-compliant operations, or insufficient understanding of construction processes, which may even result in safety accidents. In terms of management, effective supervision and coordination are vital during the construction process. Inadequate managerial skills or insufficient oversight can have an impact on construction quality. For instance, workers lacking sufficient professional skills, improper work scheduling, or disorganized management can all contribute to quality issues. Considering the environment, landscape construction sites are typically located within natural surroundings. Lack of familiarity with environmental factors and failure to consider them during the construction process can also lead to quality problems. Examples include unfavorable weather conditions, complex terrain, or inadequate water resources. To address these issues, it is important to strengthen quality control measures during the landscape construction management process. This includes strictly adhering to the design plans, ensuring the use of materials that meet the required standards, improving the management and training of the construction team to enhance their skills and qualifications, and considering environmental factors to prevent environmental damage during the construction process.

3.4 There are delays in the construction progress

Delays in construction progress are a common issue in the management of landscape engineering projects. These delays can lead to decreased project quality, increased costs, and project delays. Several factors can contribute to delays during the construction process. Firstly, in the design phase, issues such as poor design quality, flaws in design review and coordination with construction, unreasonable design plans, and excessive design changes can result in construction delays. Currently, design review within the design unit may be merely a formality, lacking strict oversight, while construction drawing review agencies primarily focus on landscape and hydroelectric disciplines, often neglecting the review of horticultural aspects. Additionally, the construction unit may lack the technical personnel for comprehensive review of landscape, hydroelectric, and structural drawings, resulting in undetected issues that only surface during the construction stage. Landscape engineering encompasses the entire lifecycle from design to construction to maintenance, but in reality, design representatives are usually not stationed at the construction site, and their presence is limited to design changes and occasional site visits. Secondly, insufficient manpower and material resources in landscape construction, including inadequate labor supply, untimely or sub-standard supply of materials and equipment, can also lead to construction delays. Thirdly, unpredictable natural factors such as severe weather conditions and frequent natural disasters, particularly typhoons, blizzards, floods, and frost disasters, can significantly impact construction progress and cause delays. Lastly, ineffective management practices contribute to delays. Currently, managers often lack the necessary professional knowledge and skills in management theory, hindering their appli-

cation in construction practices. Inadequate management leads to issues such as delayed monitoring of construction progress, lax quality control, and insufficient overall supervision, resulting in construction delays.

4. The measures to strengthen the construction management of landscape projects

4.1 Establish a sound construction management system

Strengthening the management of greening projects, standardizing the landscape industry, and clarifying management norms are imperative. It is necessary to establish and improve the management system for landscape project construction. First, it is important to develop a construction management system suitable for the organization, including organizational structure, division of responsibilities, management processes, standards, and specifications. The system should be clear, standardized, and continuously improved based on actual conditions. To ensure the implementation of the system, dedicated personnel should be assigned to oversee its implementation, supervise and inspect each step, and promptly identify and resolve issues. Second, it is crucial to establish a quality management system and enhance quality inspections and assessments. This includes preparation before construction, supervision and inspections during construction, and inspections and testing before acceptance to ensure quality control and compliance with inspection standards during the construction process. Strengthening quality inspections and assessments involves monitoring and inspecting quality issues during construction, conducting regular evaluations and analysis, and continuously optimizing and improving management systems and construction processes. Third, it is essential to establish construction standards suitable for the organization, including material selection, construction techniques, and construction quality acceptance. Specific construction standards should be formulated for different project types and work environments. It is also important to establish a document management system for classifying and archiving all records and documents during the construction process for reference and verification purposes, ensuring the completeness, accuracy, and timeliness of archival materials.

In conclusion, the establishment of a sound construction management system for landscape projects requires systematic and comprehensive considerations, including the formulation of systems, determination of construction standards, and quality inspections and assessments. Continuous experience summarization and system improvement are necessary to ensure the required construction quality.

4.2 Optimize construction organization

Optimizing construction organization is crucial for the smooth progress, management, quality, and efficiency of landscape project construction. The optimization of construction organization in landscape project management should focus on the following aspects. Firstly, in project planning and schedule management, detailed project plans and schedules should be developed, clearly defining work content, milestones, and responsible parties to ensure that construction progresses according to plan. During the planning process, factors such as resource allocation, technical challenges, and weather conditions, which are beyond control, should be taken into account, and plans should be adjusted timely to ensure construction progress and quality. Secondly, in personnel management, various skilled personnel are required for landscape projects, including designers, construction workers, supervisors, project managers, etc. It is essential to focus on personnel training, assessment, motivation, and management. Collaboration among all parties involved should be emphasized to ensure construction efficiency and quality. Thirdly, establishing effective communication mechanisms is crucial. Communication channels should be established among personnel from different aspects, enabling timely communication and exchange of information to promptly address issues. Particularly at the construction site, communication mechanisms should be established for workflow, task allocation, and responsibility implementation to avoid duplication of work and conflicts. Lastly, emphasizing quality control is essential. Strict quality control standards and inspection procedures should be established. A comprehensive and systematic inspection and evaluation mechanism should be in place to inspect and assess the construction process and outcomes, ensuring that construction quality meets requirements.

In conclusion, optimizing construction organization in landscape project management requires detailed planning, enhanced personnel management, establishment of effective communication mechanisms, and strict quality control to ensure construction progress, quality, and safety.

4.3 Strengthen construction quality management

Strengthening the quality management of landscape project construction is a crucial aspect to ensure that the construction quality meets the required standards. To enhance the quality management of landscape construction, the following aspects should be addressed. Firstly, develop detailed construction plans and quality control plans. Before construction begins, detailed construction plans and quality control plans should be developed, including key milestones, quality ac-

ceptance criteria, and procedures. During construction, it is essential to strictly adhere to the plans and implement the construction process in accordance with the established quality control measures to ensure that the project meets the required quality standards. Secondly, designate dedicated personnel responsible for quality management at the construction site. It is important to assign dedicated individuals to oversee and inspect various aspects of the construction process, promptly identify and resolve issues, and ensure that the construction quality meets the required standards. Thirdly, provide training and education for landscape construction workers. Through training and education, the skills and capabilities of construction workers should be improved, strengthening their sense of responsibility and awareness of project quality. Regular training and assessments should be conducted to ensure that construction personnel have the necessary knowledge and skills in their respective fields. Finally, conduct comprehensive inspections before project completion to ensure that the construction meets design requirements and relevant standards, facilitating smooth acceptance and guaranteeing the quality of the completed project. Additionally, due to the involvement of multiple entities in the construction process of landscape projects, effective communication and coordination should be strengthened. It is important to maintain contact and collaboration with supervision, construction, and design units throughout the construction process, proactively resolving issues in a timely manner to ensure the smooth progress of the project.

In conclusion, strengthening the construction quality management of landscape projects requires collaboration and coordination from various stakeholders. It involves developing detailed quality control plans and strictly adhering to them, as well as emphasizing training and education, communication, and coordination. Continuous learning from experience and pursuing excellence are essential to ensure that the construction quality meets the required standards.

4.4 Strengthen personnel training

In the process of landscape project construction management, strengthening personnel training is a crucial measure to ensure construction quality. To enhance personnel training, the following steps should be taken. Firstly, develop a training plan for landscape construction personnel, including the training content, methods, schedule, location, and target participants. Different training plans should be formulated for personnel at different levels and with different responsibilities. Secondly, conduct job-specific training. Job-specific training refers to providing relevant professional knowledge and skills training for personnel in different positions, such as construction workers, supervisors, engineers, and designers. Training should be tailored to their specific duties and abilities. Thirdly, establish an assessment mechanism to evaluate the performance of construction personnel through regular training assessments and performance evaluations. Rewards or promotions should be given to those who pass the assessments, motivating the enthusiasm and proactive work attitude of landscape construction workers. Lastly, continually improve the training content and methods. Landscape construction is an industry that is constantly evolving and changing, and training content and methods need to be updated and improved accordingly, keeping pace with new techniques and technologies. Continuously improving the training content and methods helps enhance the competence and skills of construction personnel. Additionally, it is important to arrange for experienced mentors to provide practical guidance. Landscape project construction involves hands-on work, so assigning experienced mentors to provide practical guidance can help construction personnel acquire more practical professional skills and experience. Mentors can also impart safety operation standards and work habits related to construction to reduce the occurrence of safety accidents.

In summary, strengthening personnel training in landscape project construction involves developing training plans, conducting job-specific training, establishing assessment mechanisms, continuously improving training content and methods, and arranging for experienced mentors to provide practical guidance. These measures aim to enhance the competence and skills of construction personnel and promote a safe and efficient construction environment.

5. Conclusion

Landscape project construction management is a crucial aspect for ensuring the quality, safety, and progress of projects. During the construction management process, various issues such as design problems, material issues, construction issues, management problems, and environmental concerns may arise, all of which can have adverse effects on project quality. Therefore, it is essential to strengthen construction management, control construction progress, and ensure project quality and safety. To address these issues, several strategies can be implemented. In summary, increasing the efforts in construction management and effectively resolving issues that arise during construction are key to ensuring the quality and safety of landscape greening projects. By implementing these strategies, we can better promote the development of landscape projects and contribute to the beautification of urban and rural environments and the improvement of ecological conditions.

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