

Analysis of Large Tree Transplantation Techniques and Maintenance Measures in Landscape Construction

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Abstract: The transplantation of large trees in landscape construction is a challenging task involving various processes and considerations. This article mainly analyzes the key techniques of tree transplantation, including preliminary preparation, transplantation methods, excavation and packaging, transportation, and planting. It also discusses post-transplantation maintenance measures such as water management, pest and disease control, and pruning. Through scientific and reasonable transplantation techniques and maintenance measures, the survival rate of large trees can be effectively improved, ensuring the smooth progress of landscape construction and providing strong support for creating beautiful garden landscapes.

Keywords: landscape construction; tree transplantation technology; maintenance

1. The Significant Role of Tree Transplantation Technology

Tree transplantation can rapidly alter the urban landscape. Typically involving evergreen trees with a diameter at breast height (DBH) of 15 cm or more, or deciduous trees with a DBH of 20 cm or more, these trees are in their vigorous growth phase during transplantation, exhibiting strong adaptability and regenerative capacity. Once successfully transplanted, they can significantly change the natural appearance of a city or community in a short period, rapidly enhancing the green landscape effect. Depending on different needs, trees with different shapes can be selected. For instance, for roadside trees, trees with straight trunks, large crowns, and good shading effects are preferred, while for

courtyard ornamental trees, trees with unique shapes are chosen. Tree transplantation is also an important means of preserving ancient, precious, and rare tree species. In the process of urbanization, some key urban construction projects may occupy the original habitats of these special tree species. Through tree transplantation, these rare tree species can be preserved. Additionally, for trees unable to survive in their original environment due to environmental destruction or changing conditions, tree transplantation provides another possibility for survival. Tree transplantation technology can also enhance the ecological benefits of garden green spaces and improve environmental landscapes. Due to the larger total leaf area formed by large trees compared to general herbaceous and shrub plants, the ecological effects they produce are more



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significant. Mastering tree transplantation technology and strengthening post-transplantation maintenance can increase the survival rate of transplanted trees and enhance their landscape effects in garden greening.

2. Tree Transplantation Techniques

2.1 Pre-construction Preparation

Before transplanting a tree, it's essential to dig a tree pit, which can be done using machinery or manually. Various types of tree pits exist, and their quality affects the survival and growth of the tree seedlings, influencing root growth. Therefore, the first step in planting trees is to dig the tree pit well.

2.1.1 Determining the Center Point: According to the drawings, the planting center point is usually determined through grid points, visual inspection, or step measurement. The planting center point is used to dig a circular pit with a specified diameter and depth.

2.1.2 Diameter Size: The pit is generally dug with a diameter 10-15 times the diameter at breast height (DBH) of the tree, depending on the size of the root ball. The root ball is typically 8-10 times the DBH of the tree seedling, and the pit should be slightly larger, usually 10-12 times. For exceptionally large trees, the pit size is determined by the actual size of the root ball, not a fixed ratio. The depth is usually slightly deeper than the height of the root ball. The pit size is determined based on experience, considering the DBH of the tree. If encountering poor soil or construction debris, the pit diameter and depth should be appropriately increased, especially when dealing with lime or construction debris, which should be removed entirely before filling with soil. If the pit is in sandy or rocky soil, it should be deepened by 20-30 cm and filled with high-quality soil to enhance water retention.

2.1.3 Pit Requirements: The pit's inner wall should be perpendicular to the ground, ensuring that the upper and lower openings are of the same size to avoid the pit's bottom being narrower than the top. After digging the pit, the inner wall should be smoothed, avoiding irregularities that may hinder the tree from settling smoothly at the bottom of the pit. It's important to dig a pit of appropriate size according to the actual situation. If the soil quality is poor or contains a lot of construction debris, soil replacement or soil improvement should be carried out; otherwise, problems such as poor growth may occur later.

2.1.4 Generally, a 1:1 mixture of peat and soil is used to fill the pit. Before planting, sterilization and disinfection should be carried out, and the surroundings should be sprayed with a 1:300 solution of bactericide using a sprayer.

2.2 Selection of Transplantation Methods

When choosing tree transplantation methods, various factors need to be considered to ensure the process's safety and effectiveness. The size, health, and growing environment of the tree determine the appropriate transplantation method. For large or poorly growing trees, methods such as transplanting with a root ball or container seedlings may be necessary. These methods protect the tree's root system, reducing damage during transplantation and increasing the success rate. If the transplant site has complex terrain, poor soil quality, or obstacles, special transplantation methods such as shallow planting or trenching may be required. These methods can address specific issues to help trees better adapt to their new environment. Different seasons and weather conditions also affect transplantation methods and results. For example, during the rainy season or in wet weather, waterproof measures may be needed to protect the trees. In dry seasons or windy weather, attention should be paid to moisturizing and fixing measures to prevent water loss or tree toppling.

2.3 Lifting and Transporting

Lifting and transporting are crucial steps in the tree transplantation process, directly affecting the success rate and survival of the trees. Before lifting and transporting, adequate preparations are required. Determine the lifting and transportation plan based on factors such as tree size, weight, and shape, selecting suitable lifting machinery and transportation tools. Ensure safety measures are in place during lifting and transportation, such as binding and anti-skid treatment. During lifting, pay special attention to protecting the roots and branches of the tree, avoiding excessive pulling or damage. Maintain the balance and stability of the tree, preventing swinging or tilting during lifting. During transportation, ensure that the trees are properly secured and supported to prevent shaking or movement during driving. Pay attention to maintaining the tree's moisture and temperature, avoiding prolonged exposure to sunlight or strong winds. For some special tree species or large trees, professional lifting and

transportation equipment and techniques may be needed. In such cases, consult professionals or seek assistance from professional companies to ensure the safety and effectiveness of the lifting and transportation process.

2.4 Pruning

Pruning is a critical step in the tree transplantation process, helping to maintain the vitality of the trees and improve their landscape effect. During pruning, reasonable pruning should be performed based on the tree species, growth environment, and transplantation purpose. Generally, strive to maintain the tree's natural shape, removing diseased, weak, or irregular branches to reduce water evaporation during transplantation and facilitate digging and transportation. At the same time, pruning helps to maintain the integrity and beauty of the tree's shape. During pruning, be careful not to over-prune, as it may affect the tree's growth and recovery. For some special tree species, special pruning treatments may be needed, such as thinning or shortening, to promote growth and adaptation to the new environment. Smooth cuts should be made during pruning to avoid tearing the bark or damaging the tree's wood. In addition to pruning branches, proper pruning and treatment of the roots are also necessary. When digging the tree, cut off diseased, decayed, or irregular roots to promote the growth of new roots and adaptation to the new soil environment. During pruning, pay attention to protecting the tree's buds and growth points to promote natural growth and recovery. For some indistinguishable buds, mark them with lime water or other protective agents to avoid accidental damage during pruning.

2.5 Pit Fixing

Before fixing the pit, determine the planting position and depth of the tree and carry out appropriate soil improvement based on soil texture, humidity, and fertility. Then, prepare the necessary materials and tools, such as supports, fixing materials, and soil. During the pit filling process, maintain the balance and stability of the tree, avoiding damage to the roots and branches. Prune and handle the tree according to its species and growth environment to promote growth and adaptation to the new environment. For some large trees or special tree species, special fixing and support measures may be required, such as setting up supports or ropes to prevent the trees from falling or tilting.

During fixing, ensure the quality and stability of the supports and fixing materials to prevent loosening or tilting. Pay attention to protecting the tree's branches and buds to avoid damage or inhibition of growth. Regularly inspect the fixing and support measures, adjust and maintain them in a timely manner to ensure the safe growth of the trees.

3. Tree Maintenance After Transplantation

3.1 Daily Maintenance After Transplantation

Post-transplantation maintenance is crucial to ensure the survival and healthy growth of trees. Here are some key maintenance measures: (1) **Adequate Water Supply:** Trees need sufficient water after transplantation to sustain their vital functions. However, avoid overwatering to prevent root rot. Adjust watering frequency and volume based on the tree's growth environment and soil moisture to keep the soil moist. (2) **Fertilization:** Fertilization is essential to provide nutrients for the trees' growth, but it should be done in moderation to avoid root damage. Choose appropriate fertilizers and follow the principle of applying small amounts frequently according to the tree's growth stage and needs. (3) **Pruning:** Proper pruning helps trees maintain health and aesthetics by removing diseased, weak, or irregular branches and promoting growth. Ensure smooth cuts and avoid excessive pruning to prevent growth inhibition. (4) **Pest and Disease Control:** Regularly inspect tree growth and promptly treat any pests or diseases to prevent them from spreading and harming the trees. (5) **Regular Inspection and Maintenance:** Regularly inspect tree growth and promptly address any issues. For trees with poor growth or pest infestations, take timely measures for treatment and maintenance.

3.2 Watering and Soil Aeration

Watering and regular soil loosening are key measures in post-transplantation tree maintenance, playing a vital role in tree growth. Keeping the soil moist is essential for the growth of transplanted trees. During the initial post-transplantation period, regular watering is necessary to ensure soil moisture, especially as the tree's root system may be damaged, reducing its water absorption capacity. Adjust the frequency and volume of watering based on the season and climate to prevent soil from becoming too wet or dry. In dry seasons, increase watering frequency and volume to

maintain soil moisture; in rainy seasons, pay attention to drainage to prevent waterlogging. Regular soil loosening promotes root growth and development. It provides oxygen and nutrients needed for root growth, aiding in root system recovery and expansion. Additionally, soil loosening removes weeds and pests, preventing competition for nutrients and moisture. The depth and frequency of soil loosening should be determined based on the tree's size and growth environment, typically around 5-10 cm deep, 1-2 times per year.

3.3 Timely Weed Removal Around Trees

Timely weed removal around trees is an essential part of post-transplantation maintenance, crucial for maintaining tree health and growth. Weeds not only compete with trees for nutrients and water but also serve as breeding grounds for pests and diseases, posing a threat to tree growth. Therefore, weeds must be regularly removed to ensure uninterrupted tree growth. When removing weeds, take care not to damage the tree's roots and branches. Use appropriate tools such as hoes and sickles to carefully remove weeds and avoid harming the trees. Also, protect the soil around the trees to prevent soil loosening or erosion caused by weed removal. In addition to weed removal, appropriate soil loosening and fertilization around the trees are necessary. Soil loosening improves soil aeration, promoting root growth, while fertilization provides nutrients for tree growth.

3.4 Effective Pest and Disease Prevention

Effective pest and disease prevention are crucial aspects of post-transplantation tree maintenance. Pests and diseases are significant factors affecting tree growth and landscape effects, making effective prevention measures necessary. Strengthen daily inspections of trees, regularly check the branches, and trunk for signs of pests and diseases. Once pests or diseases are found, promptly take measures to prevent them from worsening. Different prevention and control methods, such as biological, chemical, and physical control, should be employed based on the type and occurrence of pests and diseases. Choose appropriate pesticides and application methods to avoid harming the trees. Also, protect natural enemies and ecological

balance, reduce environmental pollution, and promote tree growth and disease resistance through proper fertilization, watering, and pruning. Plant tree species suitable for local growth conditions, avoid introducing harmful foreign organisms, and establish monitoring and early warning systems to detect signs of pests and diseases promptly. Strengthening daily inspections, adopting scientific prevention methods, enhancing tree disease resistance, and establishing pest and disease monitoring and warning systems can effectively prevent and reduce the occurrence of pests and diseases, ensuring healthy tree growth and aesthetic landscape effects.

Conclusion

In conclusion, scientifically sound transplantation techniques and comprehensive maintenance measures not only enhance the survival rate of large trees but also facilitate the smooth progress of landscape construction, providing robust support for the creation of beautiful garden landscapes. With the continuous advancement of technology and ongoing research, it is believed that tree transplantation techniques will play an even greater role in landscape construction, adding more greenery and beauty to our living environment.

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