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Discussion on Quality Control Mode of Internet + Greening Maintenance

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ABSTRACT

With the rapid increase of the construction volume of our country's landscape industry, the scale of the stock gardens is getting larger and larger. Later gardening maintenance technology needs to be constantly updated, and management modes and methods should be constantly innovated to meet the development needs of the maintenance market. The quality of maintenance and management in the later stage of green space construction is intuitively presented to the viewers through the quality of landscape. Therefore, improving the quality control ability of green space is the most important thing for the rapid development of garden enterprises. This paper combines the Internet with traditional maintenance quality management through Internet thinking, and achieves several important points in quality control, such as planning, traces, inspection, reporting and customer service evaluation, on the Internet management and control platform. Among them, the work plan combined with the maintenance calendar, the climate and soil and other environmental data from all parts of the country can better guide the field work; Maintenance trace record can provide data feedback through pictures, videos, etc.; Patrol function discovers green space problems in time, records data of basic problems of green space and feedback processing; And reporting function can provide customers with more convenient maintenance services. The addition of customer evaluation forms an important closed-loop for staff management and site quality from the perspective of customers. To some extent, this study solved the problems of insufficient quality standards and low efficiency under the traditional maintenance management mode, which accords with people's service demand for greening maintenance at the present stage, and helps to enhance people's recognition of greening personnel. With the help of Internet management and control thinking, we can better solve the pain points existing in the development of maintenance enterprises, provide new tools for the better development of maintenance industry, and lay a foundation for the growth of maintenance industry.

1. Introduction

In recent years, with the rapid increase of the construction area of green space in our country, people pay more attention to urban green space, and at the same

time, the national requirements for the quality of urban green space are constantly improving. Landscape conservation has changed from a traditional agriculture and forestry industry to a service-oriented tertiary industry.^[1]

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The market-oriented level of greening and maintenance in China is low, and the quality of greening and maintenance is declining year by year with the development of the industry. With the trend of "Internet +" sweeping all industries, the development of landscape quality management also has an opportunity.

2. The Pain Point of Maintenance Industry

2.1 Greening and Maintenance Enterprises are Uneven in Good and Bad

At present, most of the greening and maintenance enterprises are landscape construction enterprises, and a few enterprises rely on the construction team for greening and maintenance. Therefore, it is difficult to recruit the ideal greening maintenance enterprises in the tender of greening maintenance management projects, which is also an important reason why it is difficult to promote the marketization of the industry.^[2]

2.2 The Level of Maintenance Team is Declining

Horticultural practice requires the accumulation of experience and the succession of professional horticultural workers from generation to generation. Nowadays, in order to save costs, most social enterprises seldom maintain a fixed maintenance workforce. Many enterprises directly recruit temporary workers and migrant workers from the labor market when their business is busy, and undergo simple training. After that, they began to engage in maintenance work, which resulted in lack of pertinence and technicality in specific operations. Considering the cost, most of the recruited workers are the elderly, infirm or women with low wages. They can only do simple work with low technical content, such as pruning, weeding, watering and fertilization. The quality of maintenance is difficult to guarantee, and there is no way to elaborate and artistic.^[3,5]

2.3 the Quality of Landscape Declines

The poor management and control level of maintenance enterprises and the low technical level of maintenance workers lead to the poor effect of landscape presentation. Landscape quality of garden green space does not show a benign development with the development of marketization, on the contrary, it shows a downward trend, which is also a major obstacle in the process of marketization of maintenance industry.^[4]

3. Requirements for Quality Management of Greening Maintenance

Quality management in gardening maintenance is the

basis for the healthy development of gardening industry. Maintenance quality control needs to start from the following four aspects: (1) Formulate the maintenance plan and record the traces of implementation in order to facilitate the retrospective analysis of the later green space problems; (2) Regularly inspect the maintenance of green space, deal with the green space problems at an early stage, and avoid the expansion of the problems. At the same time, the occurrence of diseases and plant growth were recorded to provide reference for later maintenance managers. (3) Timely communication with customers to understand their higher service needs and solve the green space maintenance problems on important nodes; (4) Customers participate in the monthly maintenance effect satisfaction evaluation.

4. Internet + Green Maintenance Quality Control

According to the requirement of garden maintenance management, the intelligent greening maintenance platform is built with the help of mobile Internet technology, Internet of Things sensor technology, large data precision analysis technology and plant management technology, and the intelligent service mode of greening maintenance is formed^[6], which involves community green space, park green space, road green space, orchard, intelligent farm and shelter forest. Maintenance services of green space such as reserve forest and industrial green space.^[3] According to the market-oriented trend of greening maintenance, the platform provides professional services for the management and maintenance of national green space after construction; Relying on advanced domestic mobile interconnection technology and environment, it combines the core points of traditional maintenance management and control with the fast professional service requirements under the new situation, and make systems, such as mobile devices, computer rooms, sensors, positioning, regulation and control, to be integrated to achieve fast connection; Relying on greening and maintenance technology, we can provide professional services to government greening supervision units, property customers, maintenance industry enterprises and individual users.^[7]

In terms of quality control, the garden maintenance platform achieves effective quality management through the following methods:

(1) Planning Control

According to the experience of traditional gardens maintenance, the calendar of gardens maintenance is sorted out as Table 1. Landscape maintenance platform relies on the Internet of Things technology. Through the

maintenance of calendar and environmental information of green space, the plan of landscape maintenance is formulated. The environmental information includes meteorological information of the location of the garden, data information of soil temperature, humidity and fertility in plant growth environment, etc. These information are fed back to the garden maintenance platform by sensors, and then to make more elaborate, more scientific and more appropriate garden maintenance plan. At the same time, through the transmission unit, the garden maintenance plan is sent to the corresponding maintenance workers, and the image information of the key maintenance points is acquired in real time. By comparing the operation standards stored in the unit and server, the standardization and information management of gardens can be realized, and a new scientific basis for gardens maintenance can be formed. The efficiency and scope of management and control can be improved to meet the needs of market-oriented gardens maintenance.

Table 1. Monthly Plan for Garden Maintenance

Month	Solar Term	Phenological Characteristics	Key Work and Nodes
January	Great Cold, Slight Cold	Dormancy	Tree pruning
February	Beginning of Spring, Rain Water	Dormancy,	Tree pruning, water replenishment, disease and pest control
March	Insects Awakening, Spring Equinox	Avoid falling Spring Cold	Returning green water irrigation, disease and pest control, greenbelt sanitation
April	Fresh Green, Grain Rain	Growing period	Tillering bud removal, Pruning after Flowering, Disease and Pest Control, Watering
May	Beginning of Summer, Lesser Fullness	Growing period	Water supplement, post-flowering pruning, disease and pest control
June	Grain in Ear, Summer Solstice	High temperature, coke leaf	Supplementary water, disease and pest control, dedium tillage and weeding
July	Lesser Heat, Greater Heat	High temperature and wetness, weeds	Drainage, disease and pest control, medium tillage and weeding
August	Beginning of Autumn, End of Heat	High temperature and humidity	Waterlogging, disease and pest control, dedium tillage and weeding
September	White Dew, Autumnal Equinox	Cooling and drying,	Fertilizing, disease and pest control
October	Cold Dew, First Frost	Plants entering dormancy period	Fertilize and keep green space clean
November	Beginning of Winter, Light Snow	Plants enter dormancy period.	Winter irrigation and cold protection
December	Heavy Snow, Winter Solstice	Plant dormancy	Pruning and pest control

(2) Trace Management

Maintenance log is very important in the process of traditional maintenance work. When problems arise in the maintenance of green space, it can be traced back to the source in time. In this paper, the maintenance work is redefined and classified into the following categories and sub-items, such as Table 2.

Table 2. Maintenance Work Items

Number	Category of Work	Subitem of Work
1	Irrigation and drainage management	Drainage
2	Fertilization management	Fertilization of lawn, shrub and tree, rejuvenation of lawn and big tree
3	Pruning management	lawn, ball, hedge, flower and shrub, tree pruning
4	Medium tillage, weeding	Weir repair, lawn trimming, weeding, tillering
5	Plant Protection Management	Control of underground diseases and insects, dry-borers and leaf diseases and insects
6	Clean management of green space	Defoliation and other garbage disposal
7	Planting management	Lawn sowing, lawn planting, perennial root flowers and seedlings planting
8	Cold-proof management	white coating, dry wrapping and cold-proof barrier erection
9	Bright Spots	Festival dresses, flowers rent
10	Facilities Maintenance	Landscape sketches maintenance, landscape architecture maintenance

Maintenance worker receives the maintenance work plan sent by the garden maintenance platform, carries out maintenance work according to the planned time node, and uploads maintenance information in time, including work items, number, location, time and completion effect. The platform can obtain the mobile track of the workers' mobile terminal in time, and the workers' mobile terminal can be pre-loaded in the green space. Real-time gardening information based on geographic location feedback. The platform judges whether the garden maintenance plan has been completed on time according to the information of the completion of maintenance. If it is not completed on time, it will warn in time.

(3) Maintenance patrol

Through the patrol of green space maintenance, the platform can timely detect pests, weeds, garbage and other diseases in green space, and deal with them, so as to avoid the expansion of the problem. At the same time, the record of inspection results can also play a guiding role in the maintenance and management of the next year.

According to the patrol route, maintenance key points are pre-set, and maintenance managers can patrol many key points in the garden. Maintenance managers regularly patrol several fixed patrol routes set up on the spot, and

record the trajectory by terminal during the patrol, and take photos at key points to record the growth of lawns, shrubs and trees. The photos can be uploaded as real-time garden information. The real-time plant images taken by maintenance workers were compared with the preset images, and the circumstances of growth and development of plants were analyzed by plant analysis system.

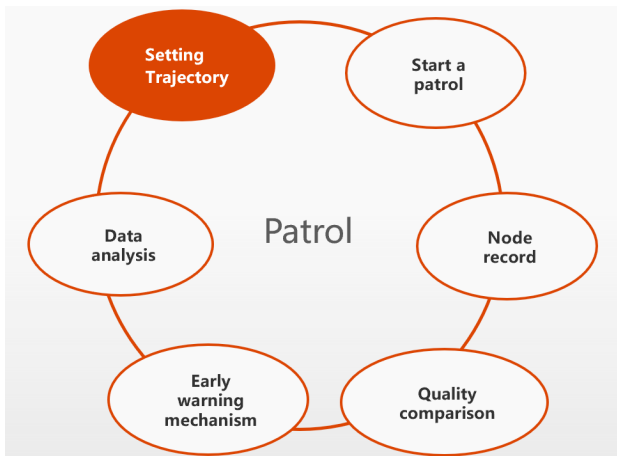


Figure 1. Landscape Maintenance Platform Patrol Workflow

(4) The Incident Reporting System

As people pay more and more attention to the green space, the demand for the service of maintenance practitioners is also increasing. The service can be more convenient through the garden maintenance platform. The specific process is shown in Figure 2 below.

Customers and tourists feedback some green space problems to maintenance workers through the platform, and maintenance workers confirm and disposal. After the report processing is completed, the maintenance workers can take the video or pictures after processing, and feedback them to customers and tourists for confirmation. Customers and tourists can evaluate and feedback this information.



Figure 2. The Incident Reporting System Workflow of Landscape Maintenance Platform

(5) Customer Evaluation System

In the green space maintenance service, the customer's suggestion is the key indicator of service quality. The garden maintenance platform includes the customer evaluation, investigation and analysis function. Specific concerns are shown in tables 3 below.

Set different maintenance scoring tables according to different seasons, and send them to the customer's scoring terminal to get the score. After obtaining several gardens' maintenance scoring tables, through statistical processing of these maintenance scoring tables, we can get the overall situation of gardens' maintenance, and can adjust the gardens' maintenance nursing strategy accordingly.

Table 3. Questionnaire Evaluation and Analysis Items

Serial Number	Specific Contents of the Survey
1	Feedback on the implementation of the questionnaire item in the Satisfaction Survey last month
2	Timeliness/completeness of submission of monthly/weekly work plan
3	Implementation and completion of key/node work this month
4	Standardized management
5	Initiative of daily operations employees
6	Grass-roots managers' ability to communicate and solve problems actively
7	Customer's comments and requests for timely feedback
8	Overall effect of green space maintenance

5. Internet + Mode Changes the Results

Through the development of Internet management and control software, the combination of green space maintenance and management and the Internet has made a fundamental change in the traditional mode of green space maintenance and control^[8]. The traditional management mode depends on the person in charge of the site, and the managers with insufficient technology and management ability will cause the quality of the site to decline seriously. And through detailed planning and feedback implementation, process standardization, then the site quality will be effectively guaranteed. At the same time, the former extensive management will be changed to fine management, so that the field work will be service-oriented and become more humane.^[9,10]

6. Conclusion

Maintenance work combined with the Internet can make greening maintenance more standardized and refined. Only by constantly applying new tools to the maintenance work, can we maintain the youth vitality of the

maintenance work and promote the healthy development of the maintenance industry.^[11]

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