SUSTAINABLE CYCLE DESIGN AND EXPLORATION BASED ON TRADITIONAL GARBAGE COLLECTION MODEL

Cheng Lin He
No. 1819, Section 2, Chenglong Avenue, Longquan, Chengdu, Sichuan, China
Sichuan Normal University Academy of Fine Arts
3045886223@qq.com

ABSTRACT

With the increasingly severe environmental problems, more and more people pay attention to the concept of sustainable design, looking for the design method to let people and nature live in harmony. Due to the acceleration of urbanization and the large amount of waste surge, the traditional waste recycling technology can not adapt to the requirements of urban waste recycling. There are still some defects in the design of waste separation and recovery facilities, so it is urgent to redesign them. The design of the article is based on sustainable design concept and systematic design method, the current situation of garbage sorting recycling, municipal waste recycling research, customer demand research, recycling label design way, garbage collection, garbage recycling facilities design and other aspects of practice and explore, from the each link of recycling, gives a kind of high efficient, beautiful, sustainable urban garbage sorting recycling system.

KEYWORDS: Municipal solid waste, Sustainable development, Garbage classification and ecycling, Design and research.

1. INTRODUCTION

The research goal of this paper is mainly to improve the classification of waste by design, to attract and improve people's environmental awareness with novel design, to carry out targeted design according to different occasions, so as to make its waste disposal space characteristic, so as to provide effective help for the sustainable development of garbage. Through the effective analysis of the classification design of excellent garbage, the biggest difference with the simple garbage bucket setting is that it can communicate with the garbage collection space to a greater extent, improve the awareness of environmental protection classification, and improve the quality of sustainable development. Choosing three types of space, commercial, cultural and residential, as the basis of investigation and practice, commercial space mainly understands the situation of garbage collection in commercial buildings. The main choice of cultural space is large museums, art galleries, as well as kindergartens, secondary schools, universities, mainly from the perspective of the educated, will design guidance awareness, the sustainable development of the idea to continue to develop. Residential space Select some old communities and new communities to compare and learn about sustainability in everyday life. Design facilities and spaces that are more conducive to harmony between human beings and nature.

2. DESIGN FOR SUSTAINABILITY

At present, the country's annual emissions of various types of garbage will be nearly 1.0*1010t, the largest amount of waste produced in the United States, more than 2.5*108t per year, Germans produce garbage 541-609kg, annual output of 50 million T. The speed of China's waste production can not be underestimated, urban solid waste treatment and recycling problems are becoming more and more serious, China's average daily production of 0.8-1.1kg waste per person, and still 8%-1.1% of the annual rate of growth, the country's annual production of domestic waste 2.0*108t around. The total amount of municipal waste accumulated over the years is up to 7 billion T, and two-thirds of the country's cities will be surrounded by rubbish. The treatment of waste waste rationalization has yet to be perfected to further promote the development of green construction in cities.

2.1Domestic and foreign garbage recycling treatment methods and current situation

Common household waste is divided into recyclable waste, kitchen waste, construction waste and so on. Garbage collection is based on garbage classification, according to the properties of garbage, its resource utilization. At present, there are several ways as follows: 1. Direct use as raw material; 2. Compost treatment for degradable waste; 3. In the case of rational disposal of garbage, the incineration of domestic garbage in China has developed rapidly in the past decade. In coastal cities with rapid urban development, developed economy, large population and limited land resources, the incineration process is relatively faster. However, the recycling rate of garbage in China is still lower than that in Japan and other countries.

On waste recycling work, China has experienced decades of time, garbage sorting recycling equipment in China has not fully popularization, the city garbage sorting facilities, citizens are not classified garbage consciousness and habit, even if there is garbage classification, since there is no set up sorting center, a lot of junk in the mixing process, the simple sanitary landfill or burned, has not been optimized processing, resulting in the new environment pollution. Waste a lot of recyclable "garbage resources". From the perspective of government managers, although various measures have been taken, such as the performance assessment standards for waste recycling efficiency in demonstration cities, the problems have not been fundamentally solved. In fact, in the process of garbage disposal, not only human and material resources, and the effect is not very obvious. From the perspective of researchers, there is a lack of in-depth research on the efficiency of urban garbage recycling. No innovative garbage classification and recovery system has been discussed.

Germany and Japan have the highest garbage disposal rate in the world, which is closely related to their scientific classification model. Japan has made great efforts in legislation to clarify the types of garbage to be classified, as well as clearly stipulate the subjects and methods of garbage disposal. In Germany, a market-oriented sorting mode is adopted. Industrial associations are used to play a role in garbage disposal such as packaging and batteries, and the power of market mechanism is flexibly used to promote garbage classification and disposal. China's waste production is small, but due to the backward treatment methods and the lack of effective classification mechanism, leading to serious problems. China can draw lessons from the experience of Japan and Germany, to explore the national conditions of waste disposal mode.

2.2Status of waste recycling facilities at home and abroad

Garbage bins as the basis of classified garbage collection system, there are many shortcomings in the design, China's design is mostly the use of metal materials, long-term use is easy to produce sharp edges and corners, and cuboid box type and narrow garbage inlet is very easy to scratch littering pedestrians and cut garbage bags, lack of safety, And make a lot of slightly larger garbage difficult to put into the inside of the box, causing a lot of rubbish to be discarded around the dustbin. In addition, the classification and labeling of garbage collection is not obvious, it is not easy to be widely recognized, which leads to the recovery and classification of garbage,

the function is not strong, its appearance defects, and the coordination with the surrounding environment. Japan divides waste into combustible items, non-combustible objects, resources, large garbage and other large categories, and further refinement, respectively, paper cups, combustible objects, plastic garbage bins, each garbage is also used in English, Japanese, Chinese, Korean and other languages to mark, and specify the color code of garbage classification, such as: Green on behalf of recyclable garbage, Blue means non-combustible garbage, red for combustible waste and so on. The United Kingdom uses green, red and grey as the classification and recovery management of domestic waste.

Many countries combine the recycling of waste and the design of environmental design, industrial design and so on, and successfully developed the solar energy Environmental protection garbage Collection box at MIT, using solar energy as the driving force to automate the classification of garbage. The new waste collection and recycling system, which is put into use in Dunedin, New Zealand, is made of recyclable materials. The bin receives cans, glass and steel bottles and cans, recyclable plastic bottles, cardboard plastic sheets and so on. From the garbage collection system of these countries, all belong to industrial product design, and combined with the actual situation of cities in different countries to carry out the design work.

2.3 Significance of the research

The redesign of sustainable garbage collection space for the increasingly serious urban waste disposal problem is mainly aimed at the lack of clarity in the classification of urban waste in China, the defects in recycling facilities, and the reasons for the inefficiency of waste recovery brought about by the user's many inconveniences in use, based on the concept of sustainable design, through data collection, Qualitative analysis, model construction and other methods to design the garbage collection space. Adhere to the concept of sustainable design as a and Xing, the formulation of a design strategy can be implemented, the current urban garbage collection system in China to improve and innovate the problems, so as to better achieve the urban solid waste recycling rate to improve and enhance the urban living environment to contribute.

To ensure the practical function at the same time, further to the garbage collection products and space for visual art promotion, so that garbage collection products from the past dirty, ugly image, its design into the environment, but also can become a bright landscape of the environment, the use of the garbage bin beautification, Yes, citizens are more actively engaged in the ranks of waste recycling. Through the research, we can call on more designers to pay attention to the concept of sustainable design, all aspects of consideration in the background of low-carbon green environmental protection conditions of sustainable design from the concept to the practical application of the strategy, to explore the concept of sustainable design to the final practical design of the design method.

2.4 Research ideas and contents

Through the study of the domestic and foreign status, according to the analysis of the current situation of China's municipal solid waste recycling, for the design and exploration of garbage recycling space has important theoretical and practical research significance. The current recycling facilities research is still in the stage of independent study, for the design of the whole space garbage collection and research is very scarce, to the user as the center, improve the practicability of recycling facilities and convenience in scale, through the atmosphere of whole space build and recycling facilities guide, actively participate in the garbage recycling activities. Through background investigation and data collection, we can understand the new city, generation, collection and treatment of garbage, deeply understand the main garbage treatment methods and technologies in China at this stage, and analyze various problems in garbage recycling.

Three types of urban commercial, cultural and residential Spaces are selected as the basis of investigation and practice. The investigation is carried out from the aspects of garbage recycling of commercial buildings, large museums and art galleries, schools and communities, etc., so as to understand the sustainability in daily life from three perspectives and reflect the value of analogy. According to the situation of the investigation and reasonable analysis, the final design.

3. RESEARCH ON THE STATUS OF URBAN GARBAGE RECYCLING, USER DEMAND SURVEY

The most USES is non-biodegradable garbage bags of materials and not recycled materials, and adopted by the color and size are different, the quality of the bag is also good and evil people mixed up, in the process of recycling use no guide to help effect, while carrying garbage, oneself also become a part of the garbage. However, the garbage bags loaded with medical waste in hospitals still have eye-catching signs and clear colors to distinguish them at a glance. Field surveys of shopping malls, residential quarters, school, found that is currently in indoor garbage cans on the morphology and size is a big difference, even have the user use waste oil drums as bearing of garbage, even if some of the trash can design a simple, but they are not fundamentally to the garbage recycling work.

From the source of the garbage collection will increase the difficulty of the staff, in the garbage can on the use of materials, the use is more mixed materials, such as the metal material, on the surface of metal material wrapped with paint, it is difficult to remove and clean, in accordance with the sustainable design concept, materials on sustainability issues still exist many problems, increased the difficulty of garbage collection.



(Figure 1: indoor recyclable trash can) (Figure 2: indoor non-recyclable trash can) (Figure 3: indoor trash can without signs)

Outdoor trash cans are divided into two categories, one is used to receive the whole bag of household garbage, the other is used to receive scattered street garbage peel. Although relatively very uniform in shape, belong to the appearance of the rectangle, armrest and roller equipped with push and pull, capacity can meet the needs of recycling, accidentally and group member early strength is not enough, poor durability, investment and remove all difficult, drainage insufficient consideration, design form and management mode of ill-considered congruent factors caused certain limitation and the difficulty. But at present, there is no obvious sign on the classification trash can, even if there is, it is not obvious, and the color of the shape is also very dim, which is difficult to adapt to the surrounding environment.



(Figure 4: garbage can in landscape area)(Figure 5: garbage cans in the block)(Figure6: smoke extinguishing trash can)

The short-distance garbage transport mainly USES the small tricycle, the volume is small, the efficiency is low. Garbage transfer stations are mostly located in the living area, where the environment is quite dirty and the smell is quite unpleasant, which is quite abrupt and disharmonious in the living area. Garbage recycling label does not make a unified standard, most of them are only with simple recycling and recovery are identified, recognition degree is low, in the case of wear and damage to judge identify relevant content, while others use very figurative expression, to a certain extent, the lack of aesthetic feeling, not good to attract consumer attention, and can't accurate judgment of garbage classification.

To sum up, in the current market, recycling facilities also is uneven, the quality of the facilities also remains to be proven, failed to play a good role in the process of waste recycling, trash can set the quantity is too little or too much, configuration location selection is not reasonable, plus the lack of space garbage collection, as well as the negative images of the filthy, the garbage collector efficiency is very low.

Figure 7: garbage collection area Figure 8: garbage truck parking

User survey can be divided into two plates, a family as a unit, the other is individual as a unit, the majority of users think of the government's measures is not perfect enough, trash hardware facilities there is a certain extent, the design defect, hope can have a more clear and easy to understand the classification of the said, for recycling categories of design, can achieve more scientific and more to understand the classification of the reason. According to the statistics of garbage production, the output of kitchen waste is the largest, followed by the recyclable waste such as glass and plastic, and the output of hazardous waste is the smallest. For the later garbage recycling frequency, it is necessary to increase the recycling frequency of kitchen waste and reduce the recycling frequency of toxic waste. The vast majority of users find the fixed point of recycling has adopted recycling garbage recycling bins are seldom found outside, just a lot of people will be discarded garbage in the greening of life, therefore in the process of implemen-

tation of the strategy should be to increase the number of recycling garbage classification of living area, and need to be more reasonable arrange recycling bin and the number of points. Many users hold a supportive attitude towards garbage collection and utilization.

However, due to the lack of a good recycling environment and scientific recycling system design, people have the idea of "if other people do not classify, it will be useless for me to do so alone", which reduces the efficiency of garbage collection. If the problem of garbage collection is divided into many links, the user is only a relatively small link, but it is a small link, if handled well, it can greatly promote the completion of the following links.

4. DESIGN OF GARBAGE COLLECTIN SIGNS, GARBAGE COLLECTION METHOD DESIGN, GARBAGE COLLECTION FACILITY DESIGN

In the design of garbage collection signs, to solve the problems in the current situation, or in the concept of allowing users to more clearly identify the specific classification signs. Use different color, and USES the bold entity, short text, using the form of point, line and plane, let more evident in the middle of the label, whole body using rectangular fillet processing, can be adjusted properly according to the size of the box body, interior label smaller, outdoor signs larger doubled, in paste, the use of the stickers, adopting sustainable coating, avoid to cause secondary pollution to the environment.

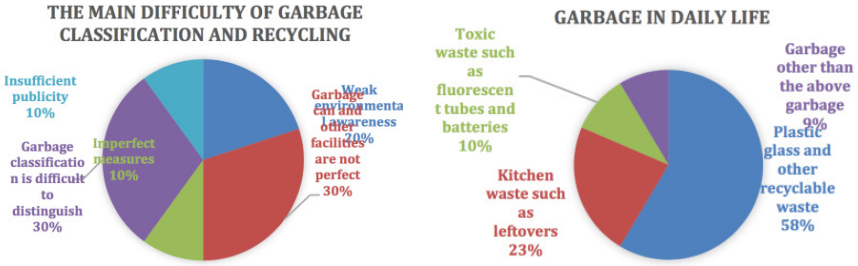
Garbage recycling is the best way to recycle is no longer as garbage, every type of garbage will have corresponding, can form the recycling of fixed and circle, household waste produced in Japan, will be sent to different depending on the nature of garbage resources sorting center, part of the garbage was sent to incinerators, the heat generated is available for power generation, environmental protection and save the economic costs. Large garbage is sent to the sorting center for crushing. Iron is sorted in this way, and available resources are sold to market enterprises. In this situation, garbage recycling can turn 90% of garbage into a reasonable resource. According to the research, we should recycle kitchen waste every day, recycle other garbage every other day, and clean up hazardous garbage in one week. It is because of the reality of Chinese cities that most families put their garbage in the garbage bin at 5:00 PM. Therefore, the general garbage truck will be in the garbage bin before 5-6 o 'clock in the afternoon, the amount of kitchen waste production in the end, and easy to damage the environment is prone to decay, cause disease, so every day regular cleaning, and other garbage due to rapid decay can be recycled every other day.

Indoor classification recycling bin: based on the concept of sustainable design, urban living space is short, to the number of a family if they want to put a lot of trash can, largely wasted the usable floor area, a certain amount of inconvenience, modular and flexible design method of assembly will be a single garbage cans can be flexible organization together. On the one hand can achieve the purpose of classification effect, on the other hand can save a lot of space. In the structure, a vertical support rod is used to organically combine the separate garbage cans for classification, so that they have overlapping parts. When the garbage can below is to be opened, the garbage can be rotated to put the garbage into it. The flexible combination of the trash can determines its function. To a certain extent, the garbage can and the garbage can cover can be decomposed into modules, which can be disassembled flexibly. When the trash can needs to be recycled, it can be processed quickly according to different types, reducing the time consumed by the secondary classification of garbage. Improve the recovery efficiency from the source. In the shape of the use of natural elements, the shape of bamboo to the design, the use of circular cylinder, can maximize the solution to the problem of dead Angle, and recycling bin and nature mutual integration, small and smart image is also very pleased. In color, green represents recyclable waste, red represents toxic waste, yellow represents kitchen waste, and blue represents combustible waste. Color can be matched according to the preferences of users.

Outdoor classification recycling bin: due to the different environment, problems to be solved are also different, relative indoor, outdoor environment need to be more durable, the first problem to be solved is waterproof and drainage, on the design of the dustbin body, at the bottom of the set has a small hole, can prevent a lot of water in barrel, the top lid inspired by building roof, the curved dome shape, and the lid of the coverage area is slightly larger than the cylinder body, the better will rain discharge in a timely manner. The shape of the whole trash can is small in the middle and small in the top. It is small and beautiful. A trolley is used on the handrail, with rubber material attached, so that the garbage collector can have a better working experience. In terms of appearance modeling, it changes the previous upright modeling and adopts round shape with artistic design, which gives people a more intimate feeling and enables more people to take the initiative to recycle garbage in an orderly manner. In the past because of the size of the dustbin is too large to cause a greater workload. The size and specification of the trash can are set at 360L, which reduces the difficulty of cleaning under the bearing strength.

Intelligent design of garbage collection box: the addition of intelligence can reduce the difficulty and improve the efficiency of the whole garbage collection process. Solar power supply design, use weak current system, avoid electric shock and fire. The intelligent clamshell system can reduce the secondary pollution of garbage, prevent rats and insects from entering the trash, and reduce the infection of diseases and bacteria. Language prompt design can better remind users, actively and consciously put the garbage into the trash can, in a long time imperceptible process, let users develop good habits. Communication monitoring technology can effectively enable environmental protection workers to know the use of dustbins and whether the garbage is full, which reduces the process of manual confirmation. Scientific calculation of the use of dustbins in each area can also enable the environmental protection department to arrange manpower more reasonably, virtually reducing a large amount of human waste.

Garbage collection space design: the originally thin trash can design often fails to meet people's needs. Lack of communication, people and space to a certain extent, affect the efficiency of garbage collection, the concept of recycling space for MSW treatment is no longer seem to be thin, from the visual and psychological, contains of the space, can make the person has better spatial experience, under the specific environment atmosphere, people will automatically classifying rubbish, and there will not be thrown into the trash can around the phenomenon. From the perspective of ergonomics, the improvement of the sense of scale is enhanced to enhance the sense of color composition. Under different occasions, each garbage space is treated artistically according to cultural background factors. Fully through the concept of sustainable design, in the details of the design of waste recycling space, improve the fun of space interaction, is the user is willing to accept and implement the concept of sustainable, reasonable garbage recycling treatment, with management personnel management and supervision, publicity. Diversified and experience the charm of sustainable design.



5. CONCLUSIONS

The increasingly serious environmental problems, we every designer should think about how to make a conforms to the concept of sustainable design, recycling recycling should be more around the concept of sustainable design, deep research on sustainable and applied research results in actual design, for every attention to ecology, environmental protection, the experience of the designers of the human and the nature harmonious. As for the design method and design style of garbage collection facilities, there are many words, but the most important thing is to take the practical function as the premise, so as to better serve the users under the premise of satisfaction. Comprehensive design of garbage classification, garbage facilities, garbage recovery system, and strive to meet the requirements of sustainable design to the greatest extent, while maintaining its beautiful appearance and efficient use function. In the design to meet the user's personalized needs for appearance, color, and reasonable to meet the layout of facilities, convenient to meet the user's behavior habits and mentality.

Although in the rapid development of science and technology, sustainable design concept never go out of style, only in this way can the human and the nature harmonious get along, be truly sustainable can bring the world good, sustainable design concept also has the very big development space in the design of the future, for recycling facilities, look forward to the most sustainable recycling will be not waste the concept of "abandoned", abandoned itself will be the beginning of another production cycle.

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