Construction Waste Management in Urban Renewal

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Abstract. For nearly a decade, along with the acceleration of the process of urbanization, construction waste has become the difficult issue in urban renewal process. As a complicated systematic project, construction waste recycling requires that governmental departments should enact relevant regulations scientifically and guide the development of relevant industries. In this paper, we analyzed the current situation and existing problems of construction waste in Longgang Shenzhen and proposed some advice.

1. Introduction

As the urbanization process accelerates in recent years, construction waste from urban renewal, urban municipal engineering and general construction increased continuously. If these construction waste was taken charged by landfill, not only Substantial amounts of land have to be wasted so as to harm the natural environment, but also a large number of construction waste recycling value could be wasted. Reasonable disposal of construction waste therefore, posed a great challenge to urban management [1-3].

In this paper, we, taking Longgang District, Shenzhen as an example, researched and analyzed the change trend of the total discharge, characteristics and resource utilization of construction waste, in order to propose appropriate policy recommendations for the government and to provide reference for China's construction waste management.

2. Current situation of construction waste in Longgang District, Shenzhen

Longgang District is the largest district in Shenzhen, which is located in northeastern Shenzhen. Longing's area totals over385 km2. In recent years, as a result of dwindling land resources in the original special economic zones in Shenzhen, Longgang District has become the main area of urban renewal. Therefore, there is lots of housing and Industrial plant which is needed to be torn down in Land preparedness and urban renewal process in Longgang.

The mainly construction waste is consist most of urban renewal, municipal construction of roads, bridges, etc. and fitting-out works. Easily recycled part of construction waste, such as scrap metal, plastic, etc., almost could be reused or recycled by urban recycling system. Construction waste is easier to re-use part (such as scrap metal, plastic, etc.), by recycling system has been formed, mostly to get re-used or recycled; inert construction waste accounts for about 75% of the part, except partially into recycling outside the system, most disposed of in landfills; and wastes containing toxic and hazardous materials are shipped directly to the landfill.

Currently, the construction waste arising from the demolition projects in Longgang District fails to be fully recycled. Partial construction waste is processed in two comprehensive utilization plants within the District; some is use to backfill the foundation ditch and roadbed in the sites such as of construction projects and municipal road projects nearby; the difficult-to-use part is transported to the refuse and clay residue field; and there is also some dumped illegally by illegal construction

companies. The illegally dumped construction waste not only occupies a large amount of land, but also results in severe physical damage to land. As a result of this, the land cannot be reused until it is restored with huge investment. Meanwhile, some illegally dumped construction waste will sometimes trigger the problems such as destruction of municipal facilities and farmlands and woodlands, land occupation, and river blockage. The reasons for these problems are as follows:

(1) According to the current regulations and policies, the national land planning department is responsible for dealing with building demolition permit or registration, and the urban renewal department is responsible for urban renewal project's planning and preparation and project implementation supervision, however, the relevant laws and policies do not explicitly stipulate who will regulate the building demolition process and how to regulate. As for the social investment demolition and reconstruction which class urban renewal project accounts for the largest portion of the construction waste emissions, the demolition, the actual emission amount, classification and the actual movement of construction waste lacks the relevant policies and regulations; the regulatory process of the whole building demolition is completely in a vacuum condition. Lack of supervision at the source results in most of the construction waste goes into the non-recycling channels or is dumped in the absence of regulation. While in government investment projects, although the streets require the demolition unit in the tender to make separate collection for construction waste, regulators often focus only on the progress of demolition and lack effective supervision for classified removal and classified collection, leading to that many demolition units simply resell the steel, aluminum and other recycling material, but lack motivation to make classified collection of construction waste. Due to the high disposal cost of unsorted construction waste, the integrated utilization business rejects unsorted construction waste, resulting in that it can only go into the non-recycled channel.

(2) Lack of legal acceptance space. The disorderly discharge of the above-mentioned construction waste is associated with the lack of legal acceptance space besides the weak law enforcement and regulation. Currently, there only are three refuse and clay residue fields, whose remaining storage capacity is less than 3 million m3 in total. Even though all these fields are used for the construction waste, they will still become unavailable in the coming few years.

The construction waste of Longgang District is being discharged in a huge amount and increasing at a high speed at present and such trend will also continue for some time to come. However, due to the severe shortage of the acceptance space, the simple backfilling is no longer an approach to coping with construction waste. Therefore, it is necessary to figure out a way to reduce, recycle and treat the construction waste harmlessly.

(3) Low handling capacity of the enterprises specializing in the recycling of construction waste

Currently, there mainly are two companies specializing in the recycling of construction waste, namely, Shenzhen Loping Environmental Protection Technology Co., Ltd and Shenzhen Yong'an Environmental Protection Industrial Co., Ltd. Assuming that their annual handling capacities are 1 million tons, respectively, and there are 1.6 tons per cubic meter, then the total annual handling capacity will be 1.2 million cubic meters.

3. Strategies and Suggestions on Construction Waste Management for Longgang District

The above-mentioned problem should be addressed from two perspectives, namely, management and economy. In terms of economy, market leverage should be utilized to build a sound interest-driven mechanism that can recycle construction waste. In respect of management, source control should be reinforced to construct basic recycling process and owner's responsibility system for construction waste.

Economic Perspective. In terms of economy, greater support efforts should be spent in facilitating the favorable industrial development. According to urban construction scale and project distribution, attention should be paid to reasonably arranging the layout of the comprehensive utilization enterprises of construction waste. Meanwhile, it is necessary to lower the access barriers for the comprehensive utilization of construction waste, and attract more social capital to the comprehensive utilization industry of construction waste in good time. Besides offering policy support for the comprehensive utilization enterprises of construction waste from the perspectives of production field

and tax preference, there is also a need to enact corresponding industrial management rules to facilitate healthy market competition.

Apart from these, relevant policies and supporting implementation measures should be devised for the treatment of construction waste as soon as possible, such as charging system for construction waste discharge, manifest management system for construction waste discharge, registration system for the discharge reduction and processing scheme of construction waste, certification system for the recycled building materials of construction waste, price information about recycled building materials of construction waste, green product catalog and governmental green purchasing catalog. On this basis, policies should be also formulated to encourage the use of recycled building materials. In the public infrastructure projects invested by government such as road construction and municipal pipeline construction projects, the recycled building materials should be used proportionally. In urban update projects, government is supposed to supervise the developers so as to ensure that they utilize recycled building materials for wall foundation and the supporting outdoor projects according to regulation agreement; meanwhile, besides clearly specifying the use scope and proportion of recycled building materials, there is a need to return total or partial earnest money according to the quantity of recycled building materials that have been used with the purpose of guiding and encouraging the use of recycled building materials.

Management Perspective. In terms of management, the dominant principle is to reinforce source control, establish the basic recycling process of construction waste, and highlight the principle of "producer=processing payer=recycler" as well as owner's responsibility system. It is necessary to promote the legislation concerning the recycling of construction waste with great efforts, establish construction waste recycling management system through legislation and execute the principle of " producer=processing payer=recycler ". Project implementation subjects who produce large amounts of construction waste in construction activities are supposed to pay the comprehensive expenses of construction waste discharge, collection, transportation, and handling. Meanwhile, they are also obligated to reuse the recycled building materials that are equivalent to the construction waste they discharge to further the reduction and harmless recycling of construction waste. To demolish the rebuilt urban update projects, the responsibilities and obligations of construction waste recycling should be subsumed into regulation agreement, and meanwhile, the discharge reduction and recycling of construction waste in project implementation process should be monitored and accepted. While demolishing governmentally invested projects, project implementers should be held liable for construction waste recycling.

In the specific implementation process, there is a need to construct and improve construction waste discharge trading information platform, apply for online declaration for the treatment of construction waste, and unveil the information regarding the generation site, transportation, discharge and treatment of construction waste. Meanwhile, it is necessary to formulate charging standard, enact and disclose market rules, and implement open tendering for the projects such as building demolition, clearance and transportation of construction waste, and recycling of construction waste. Additionally, the informatization means such as GPS positioning system and communication system should be fully used to enhance the regulation over the transport vehicles of construction waste. The illegal behaviors such as illegal acceptance and disorderly discharge should be suppressed and penalized by means of joint operation, joint law enforcement, and prize-giving reporting.

4. Summary

Cities countrywide have been failing to conduct targeted management over construction waste. In the management process, relevant departments such as environmental protection department, construction department and planning department should work together. While implementing strict management, they are expected to keep the construction waste and environmental protection under control by way of market-driven economic leverage. Only by working on these two aspects, will construction waste be turned into the renewable resources that are environmentally-friendly and able to create economic benefits.

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