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Study on the Construction Waste Logistics Cost Accounting Based on Activity-Based Costing

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Abstract

The construction waste logistics cost accounting is critical to the control of logistics cost. At present, researches on the construction waste logistics cost accounting are still relatively locking, and it has been a problem. Activity-Basic Costing, a scientific and systematic method for cost management, has some superiority compared with the traditional method. In view of the present situation of construction waste logistics cost accounting in China, the author investigated the situation of construction waste in Kunming, and established a system of logistics cost accounting based on the basic principle of activity-based costing. The author discussed and analyzed the application of activity-basic costing in construction waste logistics cost accounting.

Key words: Activity-basic costing; Construction waste; Logistics cost accounting

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1. THE STATUS

With the acceleration of urbanization process in China and the expansion of city size, the amount of construction waste is increasing. At present, total emissions of construction waste in China are between about 1.55 billion tons to 24 billion tons, accounting for 40% of total municipal waste. Today, the status of construction waste logistics cost accounting is as follows:

1.1 No Clear Understanding of the Concept of Logistics Cost

Because the development of China's logistics is still in its infancy, it is not clear enough for the understanding of the concept of logistics cost. For example, when some transport companies conduct logistics cost accounting, they simply put the transport process as the entire logistics process. Therefore, when accounting for the logistics cost, they only account transportation cost, while ignoring other logistics cost.

1.2 The Difficulty in Collecting the Content of Logistics Cost Accounting

Although it is easy to collect the transport and handing cost paid for processing construction waste, the logistics cost within various departments is difficult to collect. For example, there are some difficulties that the vehicle equipment purchase costs, depreciation costs, maintenance costs, electricity costs, fuel costs and logistics-related costs should be whether collected to logistics costs or not, and that how to collect the costs.

1.3 Too Large Scope of Logistics Cost Accounting

Logistics activity is throughout the process from the generation to the treatment of the construction waste. Departments' lack of understanding of the logistics results that the scope of logistics cost accounting is too large, including the material handling. Therefore, it is difficult to account for the construction waste logistics cost.

2. THE BASIC PRINCIPLE OF ACTIVITY-BASED COSTING

Activity-based Costing, based on the activities, is scientific methods of cost management. Its basis is that

products consume activities and activities consume resources. Its essence is that the resource driver should be firstly determined and computed, and the resources expenses should be collected to the activity center which form activity costs; that the activity driver should be secondly determined and computed, and the activity costs should be collected to the products; and that the product costs should be finally formed. The resource driver and the activity driver are the cause and basis of generating costs. The resource driver is connected to resources and activities, and activity driver is connected to activities and final products, namely resources-activities-products. The relationship between the three can be represented by the following Figure 1.

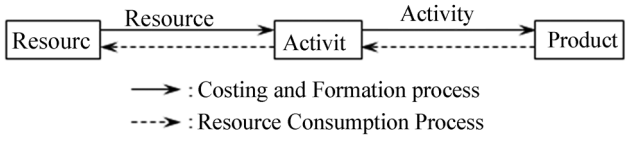

Figure 1
The Computing Schematics of Activity-Based Costing

Cost accounting is transferred from product center to activity center by activity-based costing, resource flow direction as the clue, resource driver and activity driver as the basis of cost allocation, and activity-based costing tracking reflects and analyses all of logistics activities, which expand the scope of logistics cost accounting, improve the allocation method of logistics cost, provide a more accurate cost information, increase the level of the logistics cost management, and overcome the shortcomings of traditional cost system.

3. SURVEY RESULTS AND RELATED DATA

In 2010, construction area of Kunming increases by 8 million square meters, and construction waste is produced about 0.4 million tons in the construction process. Meanwhile, Kunming plans to reconstruction 336 villages in city, covering an area of nearly 20 square kilometers, which is expected to complete the demolition task of more than 38 million square meters. During the process of demolition, construction waste generated is estimated at 38 million tons, an average of 7.6 million tons of construction wastes every year. Reconstruction of the village in the city is both a major source of construction waste and a focus of construction waste disposal. Next, based on the survey results in Kunming and related data, paper accounts construction waste logistics cost.

3.1 Survey Results

Through the investigation, we learned that the disposal method of construction waste was transported to the designated dump be open pile, and that private bought the site allowing the dumping of residue soil to sell poured bills to sediment transportation companies by certain price (generally the charge standard of dump is ￥250 yuan /vehicle). The data of treatment cost of sediment per vehicle is as follows:

The charge standard of dump: ￥250 yuan /vehicle

Penalty: ￥300 Yuan /vehicle

Vehicle fuel costs: About ￥520 yuan (according to different positions of the dump and different transport route, the costs are slightly different).

Lease expense of excavator: ￥35,000 yuan/month - ￥45,000 yuan/month

Standard radial truck of vehicle: 12 tons

Practical radial truck of vehicle: 30 tons

Driver wages: ￥6,500 yuan/month -￥7,500 yuan / month

Construction time: 8 hours (22:00:06:00)

Times: 7-8/vehicle

3.2 Related Data

According to different positions of dumps and different transport route, fuel costs are not the same. The formula is as follows:

Vehicle fuel costs=oil price×the oil consumption per 100 km×distance (100 km)

Fuel dosage=the oil consumption per 100 km×journey (100 km)

Through accessing relevant information, we learn that the average oil consumption per 100 km of the transport vehicles is 18 L (no-load) and 30 L (full load).

During transportation of construction waste, the transport vehicle is under the state of no-load and full load. So the fuel dosage should be calculated separately.

For the transport distance, depending on different situations of the local in Kunming, we select the average of 15km.

For the depreciation expense, we use average service life method.

Annual depreciation rate=(1-Estimated net residual value rate)÷the estimated useful lives×100%

Monthly depreciation rate=annual depreciation rate÷12×100%

Monthly depreciation amount=original value of fixed assets×monthly depreciation rate

According to related information, the estimated useful lives of the transport vehicle are 5 years; the estimated useful lives of material handling equipment are 10 years; and estimated net residual value rate is 5%.

During accounting process, all the costs belong to each transport vehicle and each material handling equipment. We should finally account for logistics cost of construction waste per ton.

4. ESTABLISHMENT AND APPLICATION OF LOGISTICS COST ACCOUNTING SYSTEM

Based on the above data, we will use activity-based costing to account for construction waste logistics cost in Kunming. Per ton construction waste is as a unit of product, and the logistical process is from the generation to the proper handling. According to the characteristics of construction waste logistics activity, we draw the construction waste logistics process, as follows:

Construction waste→Loading→Transport→(Transit) →Unloading→Landfill

4.1 Analyzing Logistics Activity and Dividing of the Hierarchy

By analyzing the construction waste logistics process, we have listed the following items of construction waste logistics activity, as shown in Table 1.

Table 1
Logistics Activity and Dividing of the Hierarchy

Primary activity	Secondary activity	
	Activity 1	Activity 2
Material handling	Loading	Unloading
Transportation	Convey	Vehicle maintenance
Storage	Warehousing	Handing

4.2 Determining Resource Projects and Collecting Resource Expenses

Resource is cost, which is associated with the logistics activity. After determining the logistics activity at all levels, according to the survey, we can obtain resource projects consumed by logistics activity, which mainly includes labor costs, fuel costs, maintenance costs, depreciation costs and so on. Meanwhile, we will calculate each of resources expenses. As shown in Table 2.

Table 2
Resources Expenses (Unit: yuan/car/month)

Resource projects	Labor costs	Fuel costs	Maintenance costs	Depreciation costs
Resources expenses	64,800	30,170	65,800	18,900

4.3 Determining Resource Driver and Distributing Resources Expenses to Logistics Activities

Resource driver is the way and cause that activities consume resources, and is the basis that resources expenses are allocated to logistics activities. Based on the resource projects, we will determine the resource driver. As shown in Table 3.

Table 3
Resource Driver

Resource projects	Resource driver
Labor costs	Labor hours
Fuel costs	Fuel consumption (liters)
Maintenance costs	Maintenance hours
Depreciation costs	Machine hours

We will collect each of resources expenses to activity center. As shown in Table 4.

Table 4
the Collection List of Resources Expenses

Activity center	Resource projects
Material handling	Labor Costs\ Fuel Costs\ Maintenance Costs\ Depreciation Costs
Transportation	Labor Costs\ Fuel Costs\ Maintenance Costs\ Depreciation Costs
Storage	Labor Costs\ Fuel Costs\ Maintenance Costs\ Depreciation Costs

According to resource driver (as shown in Table 3), we will allocate resources expenses to each activity center. As shown in Table 5.

Table 5
Resource Allocation List

Resource projects: Labor costs				
Activity center	**Resource driver**	**Driver number①**	**Distribution rate②**	**Resources expenses①*②**
Material handling	Labor hours	360	￥72 yuan/hour	25,920
Transportation		240	17,280	
Storage		300	21600	
Total		900	64,800	
Resources projects: Fuel costs				
Activity center	**Resource driver**	**Driver number①**	**Distribution rate②**	**Resources expenses①*②**

To be continued

Continued

Resource projects: Labor costs				
Material handling		1137		7959
Transportation	Fuel consumption (liter) 2,197		￥7 yuan/ liter 15,379	
Storage	976 4,310		6,832 30,170	
Total				

Resources projects: Maintenance costs				
Activity center	**Resource driver**	**Driver number①**	**Distribution rate②**	**Resources expenses①*②**
Material handling	Maintenance hours		￥480 yuan/ hour	21,600
Transportation				28,800
Storage				14,400
Total				65,800

Resources projects: Depreciation costs				
Activity center	**Resource driver**	**Driver number①**	**Distribution rate②**	**Resources expenses①*②**
Material handling	Machine hours		￥21 yuan/ hour	7,560
Transportation			5,040	
Storage			6,300	
Total			18,900	

Finally, the above calculation results are aggregated to obtain the total costs of logistics activity. As shown in Table 6.

Table 6
Summary of Activity Costs (Unit: yuan / vehicle / month)

Resource \ Activity	Material Handling	Transportation	Storage	Total
Labor costs	25,920	17,280	21,600	64,800
Fuel costs	7,959	15,379	6,832	30170
Maintenance costs	21,600	28,800	14,400	65,800
Depreciation costs	7560,	5,040	6,300	18,900
Total	63,039	66,499	49,132	179,670

4.4 Determining Activity Driver and Distributing Logistics Activity Cost to Cost Object

Activity driver is the basis that of activity cost is distributed to cost object. According to logistics activity, we will determine active driver of logistics activity. As shown in Table 7.

Table 7
Activity Driver of Logistics Activity

Logistics ctivity	Activity driver
Material Handling	Machine time
Transportation	Distribution
Storage	Working hour

Cost-driver rate is the distribution standard of costing. The accuracy of cost driver is the key to accurately calculate logistics cost. After determining the cost driver, we will calculate the cost-driver rate in accordance with the following formula. As shown in the Table 8.

$$R_j = \sum_{j=1}^{n} \frac{C_{ij}}{A_{ij}} \ .$$

Among: R_j-the cost-driver rate of the j-th activity cost database;

C_{ij}-the i-th activity cost of the j-th activity cost database;

A_{ij}-the i-th activity cost driver number of the j-th activity cost database;

n-the activity number included in the activity center.

Table 8
Cost-Driver Rate

Activity center	Activity cost ①	Activity driver number ②	Cost-driver rate ①/②
Material handling	63,039 yuan	Machine time: 360 hour	175.10 yuan/hour
Transportation	66,499 yuan	Distribution: 7,200 km	9.24 yuan/km
Storage	49,132 yuan	Working hou: 300 hour	163.77 yuan/hour

After calculating the cost-driver rate, according to the cost driver number of per ton of construction waste, we will calculate the activity cost of each activity cost database, and obtain the total cost of per ton of construction waste by adding activity cost. As shown in Table 9.

Table 9
The Total Cost

Activity center	Activity driver number	Cost-driver rate	Total cost
Material handling	12 hour	175.10 yuan/hour	2,101.2 yuan
Transportation	240 km	9.24 yuan/km	2,217.6 yuan
Storage	10 hour	163.77 yuan/hour	1,637.7 yuan
Total	-	-	5,956.5 yuan

We have accounted for the construction waste logistics cost in Kunming based on activity-based costing, and obtained the unit cost.

5956.5÷720=0.82 yuan/ton/kilometers.

Through the above analysis, the effective forecast of construction waste yield and the rational planning of construction waste treatment can reduce the costs of material handling, transportation and storage, which can achieve lower costs.

CONCLUSION

Through the application of activity-based costing in the process of construction waste logistics cost accounting, the paper combined with the present situation to make an empirical analysis. The conclusions are as follows:

a) Because of the construction of subway and other projects, all over the country generated a lot of construction waste. Logistics activity is a major part of every project. Therefore, the effective control of construction waste logistics cost is in favor of construction waste as one of cost budget, and can further reduce logistics cost.

b) The paper designed the logistics cost accounting system of construction waste based on activity-based costing, and applied it in empirical analysis, which provides evidence for logistics cost management of construction waste in China. It has important economic and practical significance.

REFERENCES

Fan, K. K. (2013). Enterprise logistics cost accounting—application of activity-based costing. *Coal Economic Research,* (6), 51-54.

Tang, L. H. (2008). The application of activity- based costing in logistics cost accounting. *Logistics Sci-Tech,* (6), 45-46.

Yang, X. M. (2011). Summary of construction waste resource recycling utilization in Kunming. *Building Block & Block Construction,* (6), 6-7.