

# Research on environmental cost accounting of textile enterprises based on activity-based costing

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**Abstract:** *Since the reform and opening up, while transforming the mode of production and improving the production efficiency, the industry and manufacturing industry with extensive development mode is also consuming natural resources at an unprecedented rate and destroying the environment on which people rely. With the rapid development of economy and the continuous progress of society, the environmental situation is becoming increasingly severe, which also puts forward higher requirements for environmental protection. In this context, environmental cost has been put forward and gradually recognized by the accounting academic community. It is the general trend of current social development to introduce environmental cost accounting into the daily production and operation of enterprises. This paper will choose activity-based costing as the method of environmental cost accounting, on the basis of reference to the previous research, with a specific textile enterprise as an example, elaborated based on activity-based costing environmental cost accounting basic ideas and general procedures, in order to provide some reference and suggestions for enterprise environmental cost management.*

**Keywords:** *Activity-based costing; Textile enterprises; Environmental cost accounting*

## 1. Introduction

Since the reform and opening up, the industry and manufacturing industry based on extensive development mode have been consuming natural resources at an unprecedented speed and destroying the environment that people rely on for survival while changing production mode and improving production efficiency. Environmental problems have also become the focus of people's increasing attention. Since the promulgation of Environmental Protection Law in 1989, our country has shown the firm position on environmental protection problem. At present, our country is on an economic transition period, pay attention to the ecological environment problem, and have made a series of laws, regulations and related policies. In the 19th National Congress of the CPC, it was clearly proposed that we should build a modern society with harmonious coexistence between man and nature, accelerate the reform of the ecological civilization system, promote green development and build a beautiful China <sup>[1]</sup>. Although our country has made certain achievements in the aspect of environmental protection, with the rapid development of the economy and continuous progress of society, the environmental situation is increasingly severe, thus putting forward higher requirements for environmental protection. So how to reduce the cost of the enterprise and realize the sustainable development of the enterprise on the basis of protecting the environment is the proposition that every enterprise must think about. Therefore, it is of great significance to classify the input and expenditure related to environment into the cost accounting scope of enterprises. In this context, environmental cost has been put forward and gradually recognized by the accounting academic community. It is the general trend of current social development to introduce environmental cost accounting into the daily production and operation of enterprises.

Real and effective environmental cost accounting can accurately reflect the environmental cost information of enterprises. On the basis of being conducive to enterprise management and decision-making, it can further reduce environmental pollution and resource consumption brought by enterprises and maintain ecological balance. But can't reflect the existing theoretical system and practice activity due to the pollutants, environmental damage cost of environment, and the traditional cost method cannot accurately calculating the actual costs of the final product, with the gradual expansion of production scale, the environmental costs in the product cost structure and the proportion of more and more high, its accuracy will directly influence on business decisions, Therefore, it is essential to strengthen the accounting and management of environmental costs. The method frequently used in environmental cost accounting is activity-based costing. Activity-based costing allocates environmental costs according to cost drivers, which reflects the root cause of environmental costs. It is convenient for enterprises to trace

environmental costs from the source and better control them. It can provide more accurate information about environmental costs and help enterprise managers to make decisions. This paper will choose activity-based costing as the method of environmental cost accounting, on the basis of reference to the previous research, with a specific textile enterprise as an example, elaborated based on activity-based costing environmental cost accounting basic ideas and general procedures, in order to provide some reference and suggestions for enterprise environmental cost management.

## **2. Relevant concepts**

### **2.1. Environmental costs**

Environmental cost refers to the cost that enterprises should pay to cope with the impact and take measures due to environmental pollution and resource consumption caused by economic activities in the daily production and operation process<sup>[2]</sup>. According to different stages of production, it can be divided into prior environmental costs, in-process environmental costs and post environmental costs<sup>[3]</sup>. The prior environmental cost refers to the cost that the enterprise has already paid before the start of production activities to prevent and reduce environmental pollution, such as depreciation of environmental protection equipment, environmental education and training fees for employees, etc; The interim environmental cost refers to the environmental related expenses incurred by the enterprise in the production process, such as the operation and maintenance cost of environmental protection equipment. Post event environmental cost refers to the cost of repairing and making up the environmental damage caused after the production activities, such as environmental protection tax and ecological environment loss cost.

### **2.2. Activity based costing**

The emergence of activity-based costing can be traced back to the 1930s and 1940s. American Professor Eric Kohler first put forward the concepts of activity, activity account and activity-based accounting in his Dictionary of Accountants compiled in 1952. Activity-based costing (ABC) is based on the basic principle of "products consume activities and activities consume resources". According to the cost drivers, the expenses collected in activity-based costing database are allocated into the product costs, so as to carry out cost management. Activity-based costing treats both direct costs and indirect costs as product costs, which broadens the scope of cost calculation and makes the calculated product costs more true and accurate. Activity-based costing (ABC) is usually used for enterprise management and decision-making. With cost drivers as the media, the cost is collected and allocated more accurately, so as to improve the efficiency of cost management and obtain effective information for product pricing, so as to enhance the market competitiveness of enterprises. Obviously, activity-based costing does not adhere to the traditional manufacturing expense allocation standard, but proposes the cost driver allocation theory, and flexibly uses value chain and activity chain to achieve the optimal cost allocation of enterprises<sup>[4]</sup>.

## **3. Environmental cost accounting of textile enterprises**

Our country is the first textile products processing and exporting country, but at the same time the textile industry has also been included in the key prevention and control of pollution industry. Textile auxiliaries, high-temperature processes and their high water consumption characteristics have led to a large number of industrial wastewater and smoke emissions, which run counter to the concept of sustainable development of enterprises. At present, the biggest problem of the textile industry in environmental protection is water pollution. According to statistics from the State Environmental Protection Administration, in 2010, the total amount of wastewater discharged by the textile industry of our country was up to 2454.7 million tons, on the third industrial sources<sup>[5]</sup>. With the continuous development of enterprises, the scale of production is also expanding day by day, and the proportion of environmental costs in the product structure is also getting higher and higher, so the accuracy of environmental cost collection will directly affect the decision-making of enterprise management. In the future, the threshold of environmental protection will undoubtedly become the decisive factor for the development of textile enterprises. The characteristics of activity-based costing (ABC) are different from traditional costing methods, so that it has a broader application space in environmental cost accounting. It can measure environmental costs more accurately and provide guidance for enterprise management decisions, so as to obtain more profits and protect the environment at the same time.

### 3.1. Analysis of the present situation of textile enterprises

#### 3.1.1. Basic production process of textile enterprises

In this paper, the basic thought and general procedure of accounting enterprise environmental cost with activity-based costing method will be expounded according to the material process of textile enterprises. A textile enterprise in Shaanxi Province used raw cotton as raw material to produce finished fabric after a series of processing procedures. As can be seen from Figure 1, textile enterprises discharge a large amount of waste water, waste gas and solid waste pollutants in the production process, so it is necessary to properly deal with these pollutants to minimize the damage to the environment.

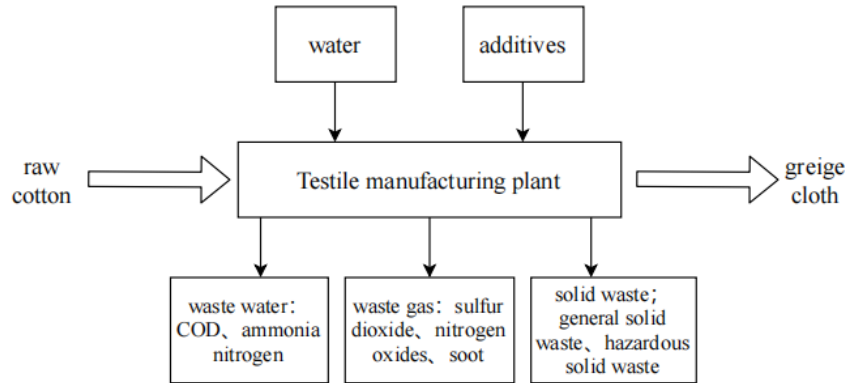


Figure 1: Flow chart of total production material of textile enterprises

#### 3.1.2. Analysis of environment-related costs of textile enterprises

In the production and operation process of the enterprise, the environment-related costs mainly include: first, the depreciation and operation expenses of environmental protection equipment. The operation and maintenance of the four types of environmental protection equipment purchased by enterprises, such as waste water, waste gas, solid waste and noise control facilities, require certain costs, and also need to be depreciated annually within their expected service life. Second, environmental protection technology renovation and environmental protection research and development expenses. In order to save energy, reduce emissions and reduce environmental pollution, enterprises will upgrade existing technologies and equipment. At the same time, corresponding expenses will be incurred in the R&D phase of environmental protection products. Third, staff health examination and environmental protection education and training costs. For the employees who are often exposed to some chemical raw materials or harmful substances in the production process, regular physical examination should be arranged. In order to improve the environmental awareness of the production staff, financial staff, all employees and even the enterprise managers, it is necessary to regularly organize them to participate in environmental protection education and training activities. Fourth, environmental monitoring costs. Enterprises set up environmental monitoring agencies in order to better supervise the environmental pollution caused by the daily production process, which will result in the salaries of the agency staff, equipment maintenance expenses and other expenses. Fifth, waste disposal costs. The material and labor cost of treating waste water, waste gas and waste residue in the production process. Sixth, fines and compensation expenses. Belong to uncertain expenditure, plan to carry in the beginning of the year commonly. Seventh, environmental protection tax. Eighth, the loss cost of ecological environment. This part belongs to the external environmental cost, which is the monetized reflection of the negative impact of enterprise production and operation activities on the external environment. Through the verification of the statement items, the cost items related to the environment of the textile enterprise include the above eight aspects.

### 3.2. Environmental cost accounting based on activity-based costing

#### 3.2.1. Basic ideas

According to the basic principle of activity-based costing, the author divides the related environmental costs into different activity-based costing bases according to the activity type, and determines the cost drivers of each ABC base. Through the analysis of the above process, the following seven activity-based cost bases were established in this paper, as shown in Table 1, which clearly reflected how environmental costs were grouped into each activity-based cost base and then allocated to product

costs according to different cost drivers.

*Table 1: Analysis of activity-based cost base in textile enterprises*

Environmental activity cost base	Environmental cost drivers
Environmental prevention cost inventory	grey cloth output (ton)
Employee development cost base	number of employees (person)
Cost database of environmental protection education and training	training times (times)
Environmental operating cost base	grey cloth output (ton)
Environment cover cost pool	grey cloth output (ton)
Waste water pollution compensation cost base	waste water discharge (ton)
Exhaust gas pollution compensation cost base	exhaust emissions (tons)
Solid waste pollution compensation cost base	solid waste discharge (ton)

Based on this, the basic thinking of environmental cost accounting under activity-based costing can be understood in detail. Therefore, the author believes that it is more scientific and reasonable to choose activity-based costing to measure environmental costs.

### **3.2.2. General procedures**

Through the above example, the author believes that when using activity-based costing method for environmental cost accounting, we should first combine with the specific production process of the enterprise and list the environment-related cost items separately from the statement. Secondly, the listed environmental costs are re-confirmed and measured, and activity analysis is carried out based on activity-based costing. Based on homogeneous activities, an activity-based costing database is established to collect environmental costs, determine cost drivers, and then the environmental costs collected in the activity-based costing database are allocated to product costs. Next, it is necessary to disclose and report the obtained environmental cost information to help users inside and outside the enterprise to make correct decisions. Finally, the environmental cost information should be deeply analyzed, and the activity-based costing method should be used to trace the source of the cost, so as to find effective measures and methods to reduce the cost, so as to reduce the environmental cost of enterprises, improve the economic benefits of enterprises, and reduce the damage to the natural environment.

## **4. Application analysis of textile enterprise environmental cost accounting under activity-based costing method**

### **4.1. Existing problems and obstacles**

Although activity-based costing can be used to calculate the environmental costs of enterprises relatively accurately, there are still some problems and obstacles in the application process of activity-based costing. First, the recognition of environmental costs is not comprehensive enough. At present, the accounting profession for environmental costs is not yet unified definition and classification, the division of the enterprises themselves in the process of concrete operation are very different, so enterprise in the collection environment related cost project is likely to be omitted or unable to define some subject, and make this part of the environment cost accounting not included in the scope and get accurate measurement, Finally affect the accuracy of enterprise environmental cost accounting. Second, it is difficult to quantify environmental costs. As mentioned in the above cases, textile enterprises will have a negative impact on the ecological environment due to pollutant discharge in the process of production and operation, and the estimated value of this part is the external environmental cost that enterprises need to bear. However, for the measurement of external environmental cost, China has not yet established unified accounting standards and guidelines, so we need to learn from the relevant foreign measurement methods, because each enterprise choose different measurement methods, will make the lack of comparability between the same industry environmental cost. Thirdly, the collection of activity-based costs and the choice of cost drivers are subjective to some extent. Since the purpose of using activity-based costing to calculate environmental costs is to more comprehensively and accurately allocate the resource consumption of each activity to the product costs that consume these activities, it is necessary to collect the homogeneous activity-based costs into the activity-based cost base and select the cost drivers of each activity-based cost base. However, in this process, homogeneous or similar activity-based costs rely on human subjective judgment, and each activity-based cost pool may have multiple cost drivers. In order to facilitate the calculation of cost drivers, there will inevitably be some deviation. The establishment of different activity-based cost pools or the selection of different cost drivers will lead to

different accounting results. Fourth, the implementation cost of activity-based costing is higher. Homework cost method can provide enterprises with a more comprehensive, system, environment of accurate cost information, but in the large enterprise business, under the condition of product sort is more, fully USES the homework cost method for enterprise is a large system engineering, not only for the enterprise informatization level and have higher demand to the professional quality of financial personnel, And the cost calculation process is quite complex, the implementation cost is also relatively high.

#### 4.2. Suggestions on application

In view of the above problems and obstacles in environmental cost accounting, the author puts forward the following application suggestions: First, improve the environment cost management consciousness, in need to fully consider the enterprise environment cost accounting in the process of production and operation cost of internal and external environment, the homework cost method is adopted to allocate included in the cost of products, at the same time, strengthen the environmental protection propaganda and training, make the enterprise managers and employees to set up correct concept of environmental cost. Secondly, the collection of activity-based costs and the selection of cost drivers have great flexibility. Enterprises need to start from the cost-benefit principle, make a proper trade-off between accuracy and complexity, and find the point where the quality of environmental cost information and implementation cost can be perfectly balanced based on the established goals. Third, establish a sound enterprise environmental cost management system. If the enterprise wants to realize the synchronous growth of economic benefits and environmental benefits, it must pay attention to environmental cost accounting and control. It should adopt activity-based costing method to construct the enterprise environmental cost accounting system, and establish the environmental cost database. At the same time, it should design its own environmental cost subjects according to the specific environmental cost projects of the enterprise. Fourth, strengthen the training of enterprise financial personnel. The enterprise adopts the activity-based costing method to carry out the environmental cost accounting, requires the financial personnel to have the high professional quality, therefore the enterprise should organize the financial personnel to carry on the study and the training regularly, so as to improve their professional level. Fifth, for external environmental costs that are difficult to quantify, the government should further improve laws and regulations to meet the requirements of the development of the situation, and formulate accounting standards and guidelines related to environmental costs, so as to strengthen the supervision of enterprise environmental standards and make enterprises have laws to follow in the accounting and treatment of environmental costs.

#### 5. Conclusion

With the continuous advancement of sustainable development and ecological civilization construction, enterprises should boldly try to convert environmental cost accounting from theory to practice, so as to create the most favorable development opportunities for themselves. In textile enterprises, for example, this paper based on the analysis of enterprise production material process and environment related cost project, on the basis of this paper is based on homework cost method, the basic methods of environmental cost accounting and general procedures, and the problems existing in the homework cost method in the application process and obstacles put forward relevant Suggestions, in order to provide some reference for the enterprise environment cost management and using for reference.

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