

Cost Control of “J” Metallurgical Products Based on Job Analysis

Cong Zheng^{1,*}, Yangchen Fu^{2,a}, Yuanyuan Gao^{3,b}, Xia Liu^{4,c}

¹Henan Polytechnic University, China

²Lanzhou Wanli Aviation Electromechanical Co.,Ltd, China

³Lanzhou Wanli Aviation Electromechanical Co.,Ltd, China

⁴Lanzhou Flight Control Co., Ltd, China

* Corresponding author: 515864416@qq.com, ^axltdmfd@163.com, ^b2123535041@qq.com, ^c2282604216@qq.com

Abstract: Compared with traditional costing, activity-based costing calculates costs down to the activity level, which is more accurate than traditional costing. In the process of cost control, activity-based costing can analyze the cost drivers of each operation and provide management with accurate cost information, so that cost control is not limited to post-event accounting, but runs through product procurement, production, assembly, and debugging. The whole process of product production. Secondly, this article uses Company M as a case to analyze the differences between traditional costing and activity-based costing in the cost accounting and cost control processes. Finally, by using activity-based costing to analyze the entire production process of “J” metallurgical products of Company M, cost control suggestions for Company M are given, so that the problems existing in the procurement process and production process of Company M can be solved.

Keywords: Traditional costing, Activity-based costing, Cost control.

1. Introduction

China is the world's largest country in the metallurgical industry. The domestic metallurgical industry has maintained rapid development and the production and operation scale of metallurgical enterprises has expanded rapidly. The country attaches great importance to the development of the metallurgical industry and is actively promoting the transformation and upgrading of metallurgical enterprises from the technical level to the management level. The metallurgical industry has many characteristics such as long processes, multiple processes, and complex processes. These problems put forward higher requirements for its cost management and control issues. Most of the product production in the metallurgical industry consists of single-piece and small-batch parts production, which is difficult to manufacture. The production cycle is long, the management range is large, and cost control is difficult. If you want to win the opportunity in the market competition, you must improve your production management capabilities. Costs directly affect a company's profits. Accurate cost control and optimization decisions can effectively help companies make scientific and objective judgments about products and markets, and make more favorable business and management decisions.

The social environment and production and operation conditions faced by modern metallurgical enterprises in the new economic era have undergone profound changes. For example, production has become more and more automated, and customer needs have become more and more diversified. The production model of this type of enterprise has gradually changed from the original one. The large-volume, low-variety model has transformed into the current order-oriented small-lot, multi-variety model. Its production features are long production processes, small batches, many varieties, and complex and diverse processes. The cost components of the cost object are constantly changing during the production

process. Different products go through different production process routes, and their cost consumption and cost composition are also quite different.

The current traditional cost calculation methods of metallurgical enterprises mostly use cost reduction method, production allocation method, etc. Most of these methods are coarse-grained and mostly divide cost objects based on product models and specifications. Enterprises use internal prices for semi-finished products and work-in-progress in multiple cost centers. Calculation, allocating the costs among different products according to rules such as proportion and difference, cannot quantify the impact relationship between various cost factors, cannot provide a strong explanation for the cost fluctuations caused by different orders, and cannot perform accurate cost restoration. , unable to reasonably arrange cost control plans based on existing conditions, companies only calculate costs and have less regard for the level of management control. These traditional methods of allocating indirect expenses using a single allocation standard cause most costs to be allocated according to irrelevant drivers, which obscures the drivers of cost occurrence and cannot accurately reveal the actual cost of the product.

Nowadays, the cost resources of this type of enterprise are allocated among different operations, the cost objects are constantly split and merged in different cost centers, and the diversification of customer needs force the enterprise's cost objects to be expanded to the market, customers, cost centers, operations As well as various cost objects such as products, the cost management model based on traditional calculation methods can no longer meet the cost management requirements of metallurgical enterprises. The activity-based costing method uses mathematical statistics based on the main characteristics of the economy, technology and other aspects of things. Method, a quantitative management method that carries out statistics, arrangement and analysis, grasps the main contradictions, distinguishes the key points from the general ones, and adopts management methods differently,

which can be better applied to this type of enterprises. More and more metallurgical enterprises start using activity-based costing for cost accounting. However, there are still few studies on further management and control from a cost perspective.

Based on this, this study combines the practical needs of a certain metallurgical enterprise and conducts a systematic analysis and comparison of the operating motivations of a certain metallurgical product of the metallurgical enterprise based on activity-based costing. Through a series of optimization strategies and methods, it provides cost control and product production structure and plan improvement. Provide support and study solutions to corporate cost control problems, with a view to providing reference for similar companies in technical practice methods of cost management.

2. Methodology

Activity-based costing is a cost method that takes activities as the core, confirms and measures all activities that consume enterprise resources, accurately records the cost of consumed resources into activities, and then selects cost drivers to allocate all activity costs to cost calculation objects. The calculation method has strong applicability to Company M with complex production processes.

Job Costing Method, also known as the ABC method, is an accounting method used for cost accounting and cost control. It is usually used in the manufacturing and service industries, especially when production units are constantly changing and need to track different costs. In the case of project or activity costing, the application of activity-based costing becomes more widespread. The core principle of activity-based costing is to allocate costs to each individual activity or project. This approach emphasizes the differences between different jobs or projects and therefore enables a more accurate cost calculation for each job. By more accurately calculating the cost of each job or project, companies can make more informed decisions, including pricing strategies, product mix, resource allocation, and production planning. In addition, activity-based costing can also help companies identify activities that are not cost-effective, thereby providing opportunities for improvement, reducing costs and increasing profits. However, ABC also presents some challenges. First, it may require more time and resources to implement because of the need to track the costs of each job in detail. Second, if costs are allocated incorrectly, it can lead to inaccurate decisions. Therefore, when adopting activity-based costing, companies need to establish an effective cost allocation and accounting system to ensure the accuracy and reliability of data.

In short, activity-based costing is an accounting method widely used in manufacturing and service industries. It emphasizes the detailed allocation of costs to better understand the cost situation of each job or project. By implementing activity-based costing, businesses can better manage costs, make smarter management decisions, and improve profitability. However, it requires companies to invest certain resources and efforts to implement and maintain, but these efforts usually lead to better long-term benefits. Therefore, activity-based costing is a cost management method worth considering for businesses that need to track the costs of different projects or activities.

(1) Determine the cost accounting object based on the company's operating conditions. Generally speaking, the object of cost accounting is usually finished products, but in

some cases it may also be customers, projects, processes, etc. First, we must understand the business needs and objectives of the enterprise to determine which cost accounting object can better support the business decision-making and management needs of the enterprise. Secondly, cost traceability should be considered, that is, cost accounting objects should be able to track relevant costs in order to accurately calculate costs. Finally, factors such as the management complexity, information availability and accuracy of each object should be considered, and their advantages and disadvantages should be compared to ensure that the accounting results are relatively accurate.

(2) According to the operating conditions of the enterprise, determine the resource drivers consumed by the operation, such as human resources, raw materials, equipment, energy, time, etc., thereby dividing direct costs and indirect costs.

(3) Divide operation centers based on enterprise layout, production and operation information.

(4) Determine the cost drivers based on the determinants of the cost of each business in the business process, such as the number of orders, demand forecasting, and inventory management.

(5) Allocate the costs involved to all cost accounting objects, and then allocate the operating costs to products. By comparing the costs and prices of each object, the level of profitability can be determined.

(6) Carry out job management.

3. Design of Production Cost Optimisation Programme for Product J In Company M

3.1. Analysis of the current status of cost control

Company M mainly manufactures complete sets of metal smelting equipment. The main cost components of the products are:

(1) Raw material cost. The raw materials for Company M's equipment are mainly mechanical processing materials such as steel, sheets, and bars, as well as accessories such as semi-finished parts and finished parts. During the equipment assembly process, standard parts such as bolts and hinges are also required.

(2) Direct labor costs. The direct labor costs of Company M's products mainly include wages, overtime pay, bonuses, insurance and other expenses for workers involved in equipment production in the production workshop.

(3) Manufacturing costs. The manufacturing expenses of Company M's products include organizational and management expenses incurred to produce the products, such as material cutting, sorting, and transportation expenses incurred before product production; wages and welfare expenses of production workshop managers; various machine tools incurred during the production of products. Water and electricity bills, machine material consumption and equipment depreciation expenses; equipment assembly and debugging expenses, etc.

(4) Management expenses. Company M's management expenses mainly include management personnel wages, insurance premiums, technology development expenses, amortization of intangible assets, taxes, etc. The company's cost structure is shown in the figure.

Figure M company cost structure

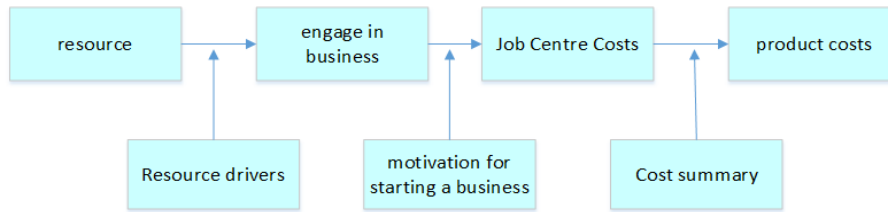


Figure 1. Operating Cost Analysis Process

Judging from the cost structure of Company M in the figure, direct material costs account for 23% of the total cost, manufacturing expenses account for 29% of the total cost, and direct labor costs account for 33% of the total cost. Company M's current ratio is lower than the industry average and there is a shortage of working capital. The allocation and utilization of resources in the production process is particularly important. Company M determines production based on sales. When setting prices, the management mainly refers to the weight of the initial equipment, the price of the outsourced processing part of the equipment, and the price of purchased finished parts for rough valuation. Company M pursues zero

inventory or minimal inventory status. The production quantity is the quantity in the contract signed with the customer, and there is no overproduction; a just-in-time purchasing strategy is adopted when purchasing, and the technical department calculates the reasonable amount of materials and the number of finished parts, and centrally manages the procurement of materials. The method of ingredients is used to reduce the procurement distance; since the parameters of each product produced will change, Company M minimizes inventory and only stocks common standard parts and commonly used sheets and bars.

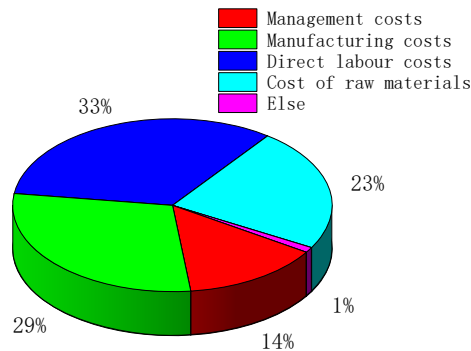


Figure 2. Cost components of Company M

3.2. Calculate product cost

The calculation of product cost is a process of aggregating the cost of various operating drivers. It is mainly divided into two steps. First, by multiplying the relevant operating cost driver allocation rate and the number of cost drivers corresponding to the product, the corresponding operating cost amount consumed by the product is obtained. The specific calculation formula is:

The amount of a certain activity cost of product A = the activity cost driver allocation rate corresponding to a certain activity × the activity driver factor consumed by product A

Secondly, the cost of each operation consumed by the product is summarized and added up to obtain the cost of the product. The specific calculation formula is:

Cost of product A = Cost of single operation

(1) Allocate resources to operation centers based on resource drivers

According to the above design, each operation center consumes different resource motivation factors, and the allocated resources are different. The eight major resource projects are allocated to each operation center according to resource drivers. The specific calculation and allocation details are as shown in the table:

Table 1. Breakdown of resource costs allocated to operations centres (10000 Yuan)

Number	Resource Project	Number of first half of 2022	Assembly Operations Center	Production Control Operations Center	Packaging and Transportation Operations Center	Machine processing operation center	Inspection Operation Center
1	Labor costs	956.80	191.36	34.94	95.68	574.08	57.42
2	Depreciation expenses	34.39			10.32	17.20	6.87
3	Material consumption	1.65	0.56	0.31		0.78	
4	Water and electricity fees	393.00				314.42	78.58
5	Transportation costs	3.59			3.59		
6	Maintenance costs	2.97				2.97	
7	Inspection fee	9.52					9.52
8	Other miscellaneous expenses	3.86	0.56	0.62	0.36	1.55	0.74
	Total	1405.78	192.58	35.87	109.96	914.21	153.16

(2) Selection of operation center drivers and calculation of allocation rates
Based on the total number of operation drivers

consumed by each operation center, the corresponding operation driver allocation rate is calculated. The specific details are shown in the table:

Table 2. Selection of operations centre drivers and breakdown of assessment rates

work center	Amount of allocated resources (10,000 yuan)	work motivation	Amount of work motivation (hours, times, times, etc.)	Activity driver allocation rate (yuan/time)
Assembly operation center	192.58	Quantity of raw materials	74817	25.74
Production control operation center	35.87	Labor hours	11570	31
Packaging and Shipping Operations Center	109.96	Labor hours	31918	34.45
Machine processing operation center	914.21	Machine hours	939578	9.73
Inspection operation center	153.16	Labor hours	62822	24.38

(3) Allocate resources consumed by the operation center to products
Based on the different activity cost drivers consumed by

product J, the resources consumed by each activity are calculated, and the total allocated resources for the production are summarized. The specific details are shown in the table 3:

Table 3. Each activity and total resources for the production

Job Center	Allocation rate of homework motivation (yuan/time, etc.)	Quantity of homework motivation (hours, pieces, times, etc.)	Assessed resources amount (10000 Yuan)
Assembly Operations Center	25.74	71076	182.95
Production Control Operations Center	31	10991	34.08
Packaging and Transportation Operations Center	34.45	30322	104.46
Machine processing operation center	9.73	892599	868.5
Inspection Operation Center	24.38	59681	145.5
Total manufacturing costs			1335.49

3.3. Comparative analysis of the results of traditional and job costing methods

The total resources are allocated based on the product output. The corresponding unit price is the allocated total resources divided by the number of output. Bring in the data and compare the cost information calculated by the traditional cost method and the activity-based cost method for J product, as shown in the table. Among them, the cost difference rate is the ratio of the difference value of the cost information obtained by the activity-based cost method and the traditional cost method to the cost information obtained by the traditional cost method.

Table 4. Cost comparison

Project	Unit product cost
Name	J Product
Traditional cost method	79100 yuan
activity-based costing method	74200 yuan
Cost variance rate	-6.19%

If the cost variance rate is greater than zero, it means that the traditional cost method underestimates the product cost; if the product variance rate is less than zero, it means that the traditional cost method overestimates the product cost. From the data in the table, we can see that the cost of product J is overestimated by 6.19%, which is 4,900 yuan. Compared with the cost information obtained by the traditional cost method, activity-based costing is a relatively more scientific cost allocation, which is a change in management concepts, management methods and management ideas. The following is a comparative analysis based on the comparison between traditional cost accounting methods and activity-based costing methods:

1. The cost information provided by activity-based costing is more reliable

The calculation results of traditional cost accounting methods will lead to distortion of cost information, making it difficult to provide an accurate basis for the company's senior management to make business decisions. In turn, possible wrong decisions will affect the overall operation. The

activity-based costing rule is conducive to cost allocation among operations and activity cost drivers. It divides product production into several operations and aggregates the operations to form a center. At the same time, the corresponding cost drivers are found out with the operations as the center and the influence factors are calculated. After two After secondary aggregation and allocation, the cost amount is allocated to the products. Since the activity-based costing method starts from each operation and calculates the corresponding influencing factors realistically, it greatly improves the accuracy of the calculation, makes the cost information more reliable and reasonable, and provides a favorable basis for business decisions.

2. Activity-based costing can optimize enterprise resource allocation

Since the activity-based costing method is based on operations, the product cost is fed back to each operation, and its resource consumption can also be understood through the operations. Then, enterprises can formulate corresponding measures based on the specific resource consumption information of each operation, so as to prescribe the right medicine, optimize resources, and avoid waste. For example, when production capacity is certain, companies should analyze the value of the operation chain, optimize product configuration, and try not to produce products that consume large amounts of resources and have small value-added potential. In the end, the resource allocation of the enterprise is optimized, the resources are rationally utilized, and even more economic benefits are brought to the enterprise.

3. Activity-based costing can improve budget control

With traditional cost accounting, the company's management can only see the total cost of each product, but ignores the reasons for the cost, and thus cannot achieve effective budget control in advance. Activity-based costing, whose accounting method is based on operations, prompts managers to pay attention to each operation, think about the causes of costs, whether each link will increase the value of the product, and consume resources on operations. At the same time, the value created by work is reflected in products. In the entire value chain, some operations can bring added value, and some operations cannot bring added value. When making financial budgets, those operations that cannot bring added value should be controlled as much as possible in the next year's budget to reduce the impact as much as possible. Consumption of resources. At the same time, those operations that can bring added value also need to be reasonably controlled in the next year's budget, so that resources can be used effectively and rationally, and we strive to make the best use of the resources and maximize the benefits from the minimum resources. Therefore, activity-based costing can play a positive role in cost budgeting, provide managers with a basis for reasonable budgeting, and reduce unnecessary consumption.

4. Activity-based costing makes product production, sales and pricing more rational and scientific.

As the degree of mechanization of enterprises becomes higher and higher, the proportion of indirect expenses also increases. At the same time, competition among modern enterprises is becoming increasingly fierce, and price has become a magic weapon for competition among enterprises. However, traditional cost accounting is likely to lead to distortion of cost information, causing companies to make mistakes in pricing products, and then lose the opportunity to seize the market. At the same time, wrong pricing may lead to

the actual product cost being higher than the cost and the price being too low. As a result, companies with more sales will also suffer more losses. If activity-based costing is used, the reflected product costs will be more reasonable, which will be more conducive to specifying market competitive pricing.

5. Activity-based costing has an inspiring effect on business management strategies

Compared with other current accounting methods, activity-based costing is more advanced. Relatively speaking, activity-based costing is relatively complete and has improved accounting. It can make cost information more reliable, optimize corporate resource allocation, make product production, sales and pricing more rational and scientific, improve budget control, improve corporate performance evaluation, and provide a basis for production and operation decisions. For enterprises, making normal judgments on production and operation decisions and making reasonable strategic arrangements for enterprises enable enterprises to improve their competitiveness not only in the short term but also in the long term.

4. Cost Control Strategy of Company M Based on Job Costing Methodology

4.1. Analysis of cost control issues

(1) High manufacturing costs

The management of Company M has formulated some cost control regulations to reduce costs, such as formulating rules to control material loss in the product blanking process, and paying workers' wages on a piece-by-hour basis. These measures have reduced costs in terms of direct product materials and direct labor. There is no Reduce product manufacturing costs.

(2) Lack of budget control

Company M uses the traditional cost method for cost control. The traditional cost method allocates the manufacturing expenses of the auxiliary department to each product in an average and linear manner based on financial variables such as output and labor hours as the standard. When calculating and allocating resources in advance, company M's product costs are divided into three parts, namely direct material costs, direct labor costs and manufacturing costs. Manufacturing costs are included in the cost based on labor hours as the cost driver, and actual production costs are not considered. The reasons for the occurrence and the allocation of resources. The management of Company M, which is in control of the matter, is mainly concerned about the cost of material procurement and whether the workshop workers ensure production according to working hours. In the post-event feedback part, the management of Company M aimed to understand profits and did not have a deep understanding of the causes of problems that occurred during the cost control process.

4.2. Cost Control Strategies for Purchasing Process Cost Drivers

The staff of the technical department of Company M have the most detailed understanding of the company's entire production process and are in contact with all departments. The classification of purchased materials by the technical department staff will not only help them master the technology and innovate, but also enable employees to

prepare drawings. 2. Be cost-aware when providing purchase lists, and provide drawings and materials according to the job classification, which will help purchasing department personnel make purchases based on cost drivers.

By analyzing the cost drivers of the procurement process, M company technical department personnel can adopt the following principles to classify procurement operations:

(1) Process priority principle

According to the machining process sequence of the purchased materials, the personnel of the technical department of Company M listed the processing steps that the materials to be purchased need to go through, that is, each operation in the production process, and the approximate production time of each operation in the workshop. According to the cost of each product Determine the procurement sequence based on the amount of motivation, which facilitates procurement personnel to reasonably allocate procurement funds and reduce subsequent procurement costs.

(2) Material type principle

Different materials and parts have fixed purchasing manufacturers and purchasing areas. M company technical department personnel separate raw materials such as bars and sheets from finished parts and standard parts, which helps purchasing department personnel understand the motivation for subsequent production operations.

4.3. Cost Control Strategies for Production and Processing Cost Drivers

Among the products produced by M company are some tool products, such as G equipment. During the processing process, due to the special processing shape and high number of processing times, the machine tool will consume more tools, and the processing tool reserves on the cutting tools and other production equipment are insufficient. The rising manufacturing overhead and cost in the production process are important factors that should be considered in the cost control process of Company M.

Through the operation chain analysis of M company's

production process, workshop managers should make advance statistics on the machine tools needed for parts production based on the product's operation chain, and submit a tool purchase list to the purchasing dep

5. Conclusions

This article first explains the basic principles of activity-based costing and the steps for cost control under activity-based costing. Compared with traditional costing, activity-based costing calculates costs down to the activity level, which is more accurate than traditional costing. In the process of cost control, activity-based costing can analyze the cost drivers of each operation and provide management with accurate cost information, so that cost control is not limited to post-event accounting, but runs through product procurement, production, assembly, and debugging. The whole process of product production. Secondly, this article uses Company M as a case to analyze the differences between traditional costing and activity-based costing in the cost accounting and cost control processes. Finally, by using activity-based costing to analyze the entire production process of Company M, cost control suggestions for Company M are given, so that the problems existing in the procurement process and production process of Company M can be solved.

References

- [1] SHANK J K, GOVINDARAJAN V. Strategic Cost Management: The Value Chain Perspective[J]. *Journal of Management Accounting Research*, 1992,4: 179-197.
- [2] RAYPORT J F, SVIOKLA J J. Exploiting the virtual value chain[J]. 1999.
- [3] DAVID, WALTERS, GEOFF, et al. Implementing value strategy through the value chain[J]. *Management Decision*, 2000,38(3): 160-178.
- [4] COOPER R, KAPLAN R S. Measure Costs Right: Make the Right Decisions[J]. *Harvard Business Review*, 1988,66(5): 96-113.