Research on the Selection of Maintenance Equipment Purchasing Mode in Equipment Distribution Process

Shuai Yue1,a, Xianming Shi1, Yabin Wang1, Liqing Rong1, Wenjie Tian2

1Shijiazhuang Campus, Army Engineering University Shijiazhuang, China
2Unit code: 94201 Jinan, Shandong, China
a814211515@qq.com

Abstract—Maintenance equipment is an important material basis of equipment distribution, and the procurement of maintenance equipment is a key link in the implementation of equipment distribution, which plays a very important role in ensuring the integrity rate of equipment. Compared with the traditional purchase of weapons and equipment, the purchase of equipment maintenance equipment has its own unique situation. In the process of choosing purchasing methods, there is a lack of specific theoretical guidance. Aiming at the practical problems of maintenance equipment procurement in current equipment distribution, this paper focuses on the characteristics of equipment maintenance equipment procurement, combs the applicability, advantages and disadvantages of various procurement methods, and puts forward some suggestions for reference.

1. Introduction

Maintenance equipment procurement is the key link to implement equipment distribution. Establishing and perfecting competition mechanism, evaluation mechanism, supervision mechanism and incentive mechanism in the process of equipment procurement is an important measure to improve the overall benefit of weapons and equipment construction, and competition mechanism is the core of the "four mechanisms". The Opinions on Deepening the Reform of Equipment Procurement System issued on December 1, 2005 clearly stated that efforts should be made to promote the reform of equipment procurement operation mechanism with competition as the core. In recent years, according to the Regulations on Equipment Procurement, the procurement of maintenance equipment is actively exploring and implementing competitive procurement methods in the face of market and battlefield requirements. At the same time, China has gradually started to promote the reform of equipment procurement system oriented by market competition, and guided high-quality social resources, especially advantageous private enterprises, to enter the equipment maintenance equipment support domain[1].

The application of bidding, an attempt to break through the single-source procurement mode, has produced positive effects, aroused great repercussions and achieved remarkable economic benefits. However, in the actual selection process, there are no specific regulations to follow, and there are no standards and systematic documents to regulate and restrict the implementation process, which cannot match the current requirements of maintenance equipment distribution and management. Faced with these difficulties, it has become an urgent practical need to standardize and unify the behavior of choosing equipment procurement methods.
2. Concepts related to maintenance equipment procurement

2.1. Difference between maintenance equipment procurement and installation procurement

"Maintenance equipment" is the abbreviation of equipment maintenance equipment. The definition of equipment research project in Military Language of Chinese People's Liberation Army in 2011 edition is: "the general name of all kinds of equipment used for equipment repair. Including equipment, components, accessories, parts, instruments, tools and materials required for equipment repair." Therefore, the goal of equipment procurement activities is not only the actual and objective weapons and equipment that have been produced, but also the procurement of maintenance equipment is an important part of equipment procurement activities. The inherent special attributes of maintenance procurement, such as continuity and complexity, determine that it is obviously different from general weapons and equipment installation procurement: First, the demand for the purchase of real installation is generally clear, the content is clear, easy to be understood, and the transmission mode is simple, so the demand can be accurately defined with a simple text or even parameters. However, the statement of maintenance equipment procurement needs may require the demander to prepare a huge procurement technical specification for this research project, and even so, it can not guarantee the absolute strictness of demand definition, and it can not guarantee the absolute specification of suppliers' understanding of this demand; second, many procurement behaviors of maintenance equipment are limited by their performance methods and achievement delivery methods, and the market environment and installation procurement are also different. The competitiveness of the maintenance equipment purchasing market is far less than that of the ordinary market, and the widespread failure of the market often causes the number of optional suppliers to drop sharply, which makes it easier to form a natural monopoly. Under the background of trade globalization, the production level of many general-purpose weapons and equipment has reached the minimum efficiency scale of the general equipment market, and the prices of the weapons and equipment produced tend to be more unified and standardized. However, the equipment maintenance equipment market has higher natural barriers and stronger asset specificity. Because of the small market share, it can only accommodate one or a few contractors who can reach the minimum efficiency scale to enter the market.

2.2. Characteristics of maintenance equipment procurement

First, the procurement of equipment maintenance equipment involves the latest military secrets and the development trend of state-of-the-art technology, which has strong confidentiality. Because of confidentiality issues, the bidding process can only be moderately open and transparent; And many maintenance equipments involve many related parts, so it is difficult to use specific data parameters to ensure the quality of standardized procurement. Second, equipment maintenance equipment has high requirements for scientific and technological content, large differences in peacetime and wartime needs, and strong fluctuations in production cycle, which will inevitably lead to huge resource consumption, intensive capital investment and long development cycle of scientific research projects; These characteristics not only put forward harsh conditions for the procurement of maintenance equipment, but also make it have the characteristics of non-scale economy; Third, the equipment distribution system structure is becoming more and more complex due to the substantial improvement of equipment informatization level, which leads to the increasingly diversified composition of production cost and procurement cost. At the same time, because the non-monetary cost factors have a prominent influence on the cost of maintenance equipment procurement, the procurement price is increasingly lacking in competitiveness and comparison; Fourth, a series of factors, such as the management mode, production layout, policy orientation, financial support and so on, have determined that the entry threshold in the field of maintenance equipment procurement is high and the monopoly is strong. This resulted in a small number of bidders for many key and important maintenance equipment, and even only one or two qualified bidders. It is often only possible to use a single source of procurement; Fifth, the competitive procurement of maintenance equipment is in urgent need of the support and standardization of laws and regulations. Due to the particularity of maintenance equipment, the operation mode of public bidding in
the procurement process will be subject to many restrictions, including the selection of contractors, the process of equipment research and development, the way of experimental links, the time of product delivery, and the requirements of contract management and supervision.

3. Types and advantages and disadvantages of maintenance equipment procurement methods

There are many similarities between equipment maintenance equipment procurement and government procurement. Both of them belong to the category of public procurement in essence, and they have the same basic attributes. At present, the procurement methods included in government procurement generally include public bidding, invitation bidding, inquiry procurement, competitive negotiation, single source procurement and so on. Public bidding is a procurement way and way to achieve the purpose of obtaining high-quality and low-cost equipment by publicly publishing procurement information, selecting contractors for the whole society to form open competition; Invitation to bid is a method in which the bidding unit selects some qualified units and sends them an invitation to bid according to the information accumulated by itself in the past or the materials provided by authoritative organizations, and the units in Accept an invitation purchase the bidding documents for bidding within the specified time; Competitive negotiation refers to a procurement method in which an agency or purchaser negotiates with no less than three suppliers respectively, and finally determines the winning supplier by agreeing on prices, conditions and contract terms; Inquiry procurement means that the purchasing unit determines no less than three units from the list of contractors that meet the corresponding qualifications to send inquiry notices to them for quotation, from which the purchasing method of the transaction unit is determined; Single-source procurement refers to the procurement mode in which the purchaser directly negotiates with the only contractor and signs a contract.

| Procurement method   | Advantages of this method                                                                 | Disadvantages of this method                                                                 | Applicable conditions                                                                 |
|----------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Open tender          | The procedure is the most strict and standardized, and the fairness is the strongest, which is conducive to preventing risks and eliminating fraud | Long cycle, high procurement cost and heavy workload                                         | Projects within the centralized procurement catalogue or above the standard of public bidding amount |
| Invite bidding       | The bidding cost is small, the cycle is short, and the workload of bidding and evaluation is small and fair | It is easy to appear the phenomenon of serial bidding, which artificially limits the selection range of the contractor | Special projects that can only be purchased from a limited range of suppliers, or the cost of public bidding accounts for a high proportion of the total value of the project |
| Competitive negotiation | It is conducive to emergency procurement, and the details of the contract can be negotiated in detail, which is conducive to the use of reciprocal conditions | Violation of the spirit of free competition and encouragement of price monopoly              | There is no response to the supplier after bidding, the technical complexity is special, the specific requirements can not be determined, or the bidding time can not meet the urgent needs of users |
Inquiry purchase

- The preparation period is short, which saves a lot of bidding and flexible negotiation between supply and demand sides.
- Too inclined to quote, ignoring the inspection of suppliers.
- The procurement items have unified specifications, unified standards, simple comparison, convenient comparison and small price change range.

4. Single source procurement

- The channel is stable, the procedure is the simplest, the quality is reliable, and the after-sales service is relatively good.
- It is easy to form a monopoly and the price is easy to be raised.
- It can only be purchased from the only supplier, it cannot be purchased from other suppliers in case of unforeseen emergency, or it is necessary to ensure the consistency of the original project and the service supporting requirements, and it is necessary to continue to purchase from the original supplier.

4. SELECTION OF PURCHASING METHODS FOR EQUIPMENT MAINTENANCE EQUIPMENT

First of all, one of the remarkable features of market economy is competition, and the competitive procurement method is more open and normative, the process is easier to control, and the results are more obvious. Bidding can effectively achieve competition. The state has standardized the tendering and bidding activities for maintenance equipment, requiring maintenance equipment procurement projects with clear target content, clear completion time limit and able to determine evaluation criteria, and bidding should be carried out when selecting project undertakers [3]. Therefore, in principle, except for some items restricted by specific factors, most of the procurement of maintenance equipment should be carried out by means of open bidding and invitation bidding. Secondly, there are many factors that affect the procurement mode of equipment maintenance equipment, and the specific conditions of each project are different. In order to avoid the loopholes left in the system that lead to avoiding competition, we should try to unify and standardize the factors that affect the selection of procurement mode of equipment maintenance equipment and realize accurate quantitative management as much as possible. With reference to the specific practices at home and abroad and in combination with the actual procurement of maintenance equipment, the following standards and methods should be followed to select equipment procurement methods.

4.1. According to the classification selection

For confidential equipment procurement information that cannot be processed, only equipment procurement methods other than public bidding can be selected.

4.2. According to the project amount

All countries in the world, regardless of government procurement or various equipment procurement, require special provisions on the scope of project funding limits applicable to various procurement methods, establish a unified military equipment maintenance equipment procurement project funding calculation standard, and select procurement methods with reference to this standard, which can make the procurement behavior more regulated;

4.3. Choose according to the number of undertaking units

Competition must have a large number of qualified contractors to support the market environment. Therefore, the number of contractors is also one of the important factors that restrict the selection of procurement methods. Determining the purchasing method according to different suppliers’ optional range can make the purchasing behavior of equipment maintenance equipment more targeted.
4.4. Choose according to purchasing time limit
Different procurement methods require different time to conclude contracts, and procurement time limit is also one of the factors that restrict the choice of procurement methods. Different equipment maintenance equipment is purchased, and the production and delivery time requirements are different. According to the provisions of the Bidding Law, at least 20 working days shall be reserved from the date of issuance of the tender announcement to the date of bid opening to ensure that the bidder has sufficient time to complete the tender. Therefore, the scientific research projects allowed by the procurement time limit can be concluded by means of public bidding and invitation to bid. Other procurement methods can be used if it is less than 20 working days [4].

4.5. Choose according to generality
In the face of production technology with strong universality and wide application range, there are many corresponding contractors, and the price is relatively stable, which is suitable for bidding procurement or inquiry procurement.

To sum up, when choosing the procurement method of equipment maintenance equipment, we can refer to the following suggestions: if the project is common and does not involve confidentiality, we should choose the open bidding method when the market resources are abundant; If the project is highly professional, has certain confidentiality and uneven market resources, and the number of potential suppliers is small, we can consider inviting tenders; If the number of responding suppliers is too small after issuing the tender announcement, competitive negotiation can be adopted; If the general rate of the project is high, the price fluctuation is stable and easy to compare, and the procurement cost is too high by bidding, the inquiry procurement method can be used; If the procurement time is very urgent, and there are very few contractors meeting the parameter requirements in the market, the single-source procurement method can be selected.

5. Conclusion
According to the long-term plan of the country and the army, the investment in the supply of equipment maintenance materials will continue to increase and enter a peak period, and the workload of bidding and purchasing will also increase greatly. The choice of purchasing method should not be the bottleneck restricting the distribution and guarantee of maintenance equipment. It is not only the requirement of the socialist market economy system, but also the demand of the development of high-tech equipment to choose the procurement mode of equipment maintenance reasonably. In the next step, we should standardize the selection of procurement methods for equipment maintenance equipment, actively use competitive procurement methods, fully mobilize the enthusiasm of enterprises, and explore a more complete procurement management mode for equipment research, production and maintenance.

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