



Contents lists available at SEI

Management & Engineering

journal homepage: www.seiofbluemountain.com



Adapt to Transformational Development Promote the Life Cycle Cost Management of Military Supplies and Equipment

Ying HAN, Xiangrong LIU

Department of Aviation Military Supplies, Xuzhou Air Force College, 221000, P.R.China

KEYWORDS

Transformational development,
Life Cycle Cost,
Military supplies and equipment

ABSTRACT

The significance of promoting the Life Cycle Cost (LCC) management of military supplies and equipment was elaborated by introducing the concept of LCC. The role of LCC management in the building of military supplies and equipment was presented, and the issues which need attention in the LCC management process of military supplies and equipment were discussed.

© ST. PLUM-BLOSSOM PRESS PTY LTD

With the rapid development of national defense modernization, a variety of new types of military supplies and equipment have been allotted to troops, which lead to the enhancement of new managing requirement. The aim of practicing the military supplies and equipment in LCC management was to maximally raising the utilization rate of limited defense budget by caring out dynamic management in a planned way and making each section fit for each other. The implementation of LCC management shows an obvious benefit of future and it was born under the objective demand of promoting the transformational development of military supplies and equipment.

1 The Concept of LCC

Life cycle cost is the total cost of equipment, including its cost of demonstration, development, production, operation, maintenance, and decommission over its prospective life cycle. It's the summation of cost for all the resource expended for the ownership during the equipment life with consideration for the time value of money. LCC is an extremely important economical parameter and it has become the important factor of modern quality concept.

The LCC of equipment comprises acquisition cost and maintenance cost. Maintenance cost includes the user charge and repair expense. The simplest mathematical model of LCC is

$$LCC = RDC \text{ (or AC)} + SUC$$

Where

LCC = Life Cycle Cost

RDC = Research and Development Cost

AC = Acquisition Cost

SUC = Sustaining Cost

Acquisition cost is typically one-off payout, which was paid on someone's own initiative to implement some kind of conception. Maintenance cost was paid discontinuously and passively during the equipment operating process. The former is easily attracting our attention and the latter easily to be ignored. However, in practice, the maintenance cost is usually much higher than the acquisition

cost. The existence of such a contradiction often leads to some wrong decisions. And this is the reason why in recent years, there is a growing emphasis on LCC management.

2 The Significance of Promoting the LCC Management

In the past, people lack the awareness of LCC management in each link of the equipment life cycle. Pursuing the minimum expense on every stage always results in many indemnificatory problems and the increase of maintenance costs. The increment speed is so rapid that it has reached to the point of insupportableness and attracted people's more attentions to the equipment maintenance system. Practice has proved that the first several actions before the equipment acquisition have the greatest impact on the final equipment cycle cost, which means that the intolerable maintenance cost was mainly caused by the faults happened in the developing process. The LCC management requires us to take actions as soon as possible and analyze the LCC on each decision-making node. Recently, a concept about 'fixed cost design' was presented, which means setting the equipment LCC target, regarding the cost as an independent variable, managing the equipment cost at every develop stage and keep the cost balancing with the equipment performance and schedule. So we can say, the LCC concept is an important aspect of the implementation of equipment entire-system and whole-life management. It represents the idea of system management.

3 The Role of LCC in the Management of Military Supplies and Equipment

3.1 Estimating expense in advance and proposing limited fee design of military supplies and equipment

With the development of high and new technology and the performance improvement of military supplies and equipment, the cost price rose and the increment speed of maintenance costs increased faster, which forced all the countries around the world to promote the durably economic strategy and comprehensively consider the relations of equipment quality, performance and cost. A cost controlling method named 'fixed cost design' was emerged as the times require. Fixed cost design of military supplies and equipment means setting scientific and logical LCC target at develop stage, take actions in the balancing of efficiency and cost and searching the maintenance management technique for an economic acceptable military supplies and equipment system. At present, under the situation that the outlays for the construction of military supplies and equipment are limited and the contradiction of supply and demand is increasing, it has become extremely important for us to take effective actions as soon as possible, which include promoting the 'fixed cost design' of military supplies and equipment, enhancing the management of develop stage and strictly controlling the maintenance cost and the LCC by using the successful experience of foreign armed forces for reference and combining the practical situation of domestic armies.

3.2 Applying the LCC theory to guide the purchase of military supplies and equipment

With the renewal of military supplies and equipment, the tactical and technical performance indicators are continuously increasing, correspondingly the requests of maintenance costs and management expenses are rising. Separating the equipment develop and acquisition cost from maintenance costs, focusing on the former and ignoring the latter are no longer fit for the development demand of modern military supplies and equipment. The LCC viewpoint makes us recognize that once decided to buy a device, it means bearing all the costs in its whole life cycle. Generally, equipment acquisition cost is only a part of the LCC, and the maintenance cost is usually several times bigger than the former. Therefore, when we make the decisions to buy something, we should consider not only the present acceptability but also the future acceptability during its entire service life.

3.3 Applying the LCC theory to raise the reliability and maintainability of military supplies and equipment

The most part of LCC are composed of acquisition cost and maintenance cost. Figure 1 shows their relationships with the equipment reliability and maintainability.

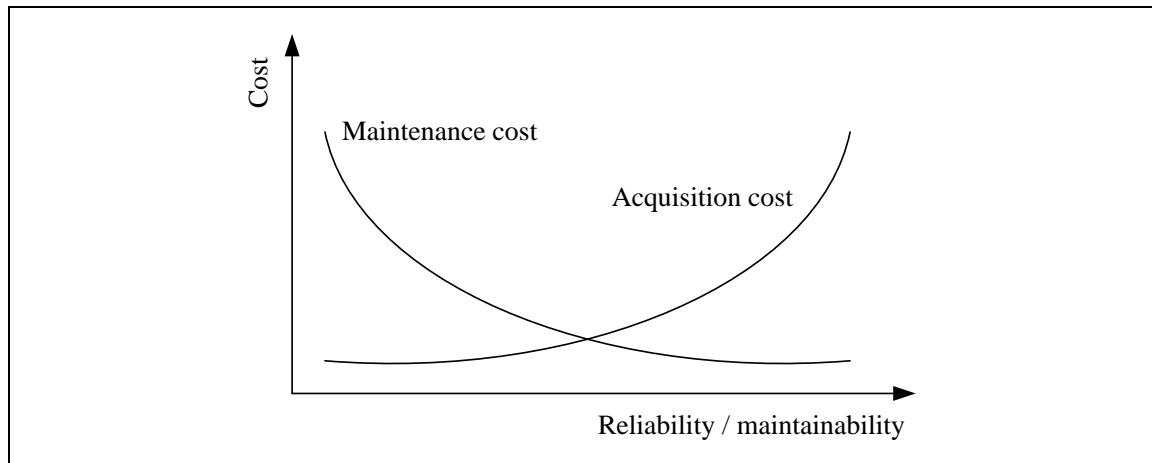


Figure 1 The relationship between the cost and the reliability or maintainability

The lower the equipment reliability or maintainability, the lower the acquisition cost and the higher the maintenance cost and the LCC. On the contrary, the higher the equipment reliability or maintainability, the lower the maintenance cost and the higher the acquisition cost and the LCC. The aim of LCC management is to maximally improve the equipment reliability and maintainability so we can decrease the cost of repairing it, which means to get the lowest point on the figure 1.

3.4 Applying the LCC theory to optimize the efficiency of military supplies and equipment

LCC research is a kind of decision-making technique of distributing resource based on system engineering. The more cost in developing process, the less cost in maintaining process. The development and production department should devote themselves to the future cost of operation and maintenance at the beginning of developing stage, and comprehensively consider the equipment performance, efficiency and cost, in order to maximally decrease the lowest LCC and get the maximal benefit, which means to scientifically analyze all aspects of equipment performance, including the reliability, maintainability, security and efficiency, and optimize the relation between cost and efficiency.

3.5 Analyzing the optimal life cycle of military supplies and equipment and decommissioning the obsolete stuff

The storing and repairing process occupy most of time of equipment life cycle, especially during the peacetime. The more the volume of stocks, the more cost devoted to, which means it is particularly necessary to decrease the volume of stocks and reduce the repairing time. To attain this purpose, we should analyze the LCC of military supplies and equipment, ensure the best life cycle and institute the decommissioning standard.

4 The Issues Which Need Attention in the Promoting Process of LCC Management

There are a lot of difficulties in the promoting movement of LCC management in the troops since it's a long-term issue. The followings should be paid more attention to:

4.1 Increasing the awareness and changing the attitude

a) Changing the focus of quality viewpoint from performance to efficiency and LCC; b) raising the LCC consciousness instead of cost consciousness; c) aware that most of the LCC was determined by the prophase of decision-making, not the cost expended during the equipment whole life cycle.

4.2 Improving the institution and organization

Promoting the LCC management should establish a complete set of institutions and organization to supervise the execution. At the present time, the existing managerial system is dispersive. Two certain departments should be assigned, one for executing the work of LCC management, the other for researching the effectual methods of how to execute the LCC management, establish the criterions and supervise the execution.

4.3 Promoting legislation

Promoting legislation is the fundamental measure and construction to develop the LCC management based on legal system. Guiding by laws can help us avoid short views and randomness. To achieve this purpose, some actions should be carried out, which includes

adding correlative contents about requirement and responsibility of LCC management in the existing equipment managing code, establishing the LCC management system and standard, making the LCC management having laws to go by, and so on.

4.4 Carrying out scientific research vigorously, establishing cost database and decision-making aiding system

Collecting and analyzing cost data and other basic data is a very important and far-reaching foundation work for the LCC management promoting. We should establish the equipment system database or the data storage and searching system and develop appropriate cost model and computer aiding decision-making system in all the national defense develop units, the production department and the army services as soon as possible.

5 Conclusion

The life cycle cost theory is about economic decision-making, which aims to improve the economical efficiency of military equipment's life cycle cost. During the period of military transformation, despite some analysis and research work and even some achievements in certain fields, no all-round or systematic research work and application of the life cycle cost have ever been made. With the further development of military transformation, the application of the theory is bound to greatly improve the modernization and effectiveness of military equipment.

References

- [1]. WANG Hangong etc. Equipment Whole System and Life Cycle Management, Beijing: Defence Industry Publishing House, 2003: 56-93 (In Chinese)
- [2]. Robese Radley. Life Cycle Cost & Process Selection. Lcc Conference, Stavanger-Norway, 1998, 5: 28-29.
- [3]. Proffitt JT. Life Cycle Costs Aircraft System [J]. British Crown Copyright, 1994 (1): 1-3.
- [4]. LUO Yun. The Method and the Application of the Equipment LCC [M]. Beijing: Ocean Press, 1922. (In Chinese)
- [5]. Fabrechy WJ, Blanhard BS. Life Cost and Economic Analysis [M]. New York: Prentice Hill, 1991.
- [6]. Charlie Fu. IFC Implementation in Life Cycle Costing [J]. Journal of Harbin Institute of Technology, 2004, 11 (4): 437-441.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.