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Modeling of Economic Cost Distribution in Screw Thread

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ARTICLE INFO

Article history

Received: 9 April 2020

Accepted: 23 April 2020

Published Online: 31 May 2020

Keywords:

Modeling analysis

Screw

Thread

Economics

Cost distribution

AC

TC

VC

AFC

MC

ABSTRACT

The screw threading produce is a important process course. The economics modeling is established in this paper so this process will be investigated. In this paper modeling of process is analyzed. The Q and cost decreases with the increasing quantity while the same turn as $AC > AFC > MC$ is found. AC and AFC is main factors to affect quantity then MC do. It fits to concept of them well. The cost AC and AFC is higher upon $L=4$ than $L=6$ while MC is higher upon $L=6$ than $L=4$. Meantime the TC and VC is higher upon $L=6$ than that upon $L=4$, is the near parallel line. The $TC > VC$ is turn to affect cost. There is a difference for them. TC and VC is main effective costs to compare with AC, AFC & MC. The TC and VC become bigger upon $K=5$ than $K=7$.

1. Introduction

In motor thread process the screw will be granted thread which is a important process to form complete profile good. The cost evaluation is a important one to save person and capital. So model is established that includes function of cost and quantity to solve the cheapest cost. It lets L is a independent variable and L and K is constant to find the cheapest cost. In economics the cost may be calculated according to define different parameter so it is solved by the correspondent formula to each parameter. The establishment of fact parameter is based on the thread process only and it is found that the every cost

changes in a course with independent variable. The cost is significant in economics which may draw every curve to evaluate the whole trend in quantity^[1-6]. Only in this way can we find the optimum path to choose and solve our cost aim. Certainly in this computation it is optimum original parameters to ensure the reality and optimum. By comparison it is found the whole data fit to well. So it is thought that the establishment is successful by this path. We can compute the formula through a certain parameter and adopt optimum resolution to obtain constant for our cost evaluation. We looks forwards to making a role in our cost and quantity calculation in this paper^[7-9].

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2. The Economics Non Linear Modeling

Production quantity Q is defined as below

$$f(L, K) = Q = \gamma L^\alpha K^\beta \quad (1)$$

γ is technique coefficient; α is producing labour; β is capital elasticity. It has

$$\ln \gamma = \ln Q - \alpha \ln L - \beta \ln K \quad (2)$$

Due to equation (1) it obtains

$$\ln(Q_1 / Q_2) = \alpha \ln(L_1 / L_2) + \beta \ln(K_1 / K_2) \quad (3)$$

Here, 1 and 2 is two coordinate.

$$\ln(Q_2 / Q_3) = \alpha \ln(L_2 / L_3) + \beta \ln(K_2 / K_3) \quad (4)$$

α is solved in terms of (3) and it can be gotten

$$\alpha = \frac{\ln(Q_1 / Q_2)}{\ln(L_1 / L_2)} - \beta \ln(K_1 / K_2) \quad (5)$$

$$\text{And } \alpha = \frac{\ln(Q_2 / Q_3)}{\ln(L_2 / L_3)} - \beta \ln(K_2 / K_3) \quad (6)$$

In terms of above equation below can be gotten

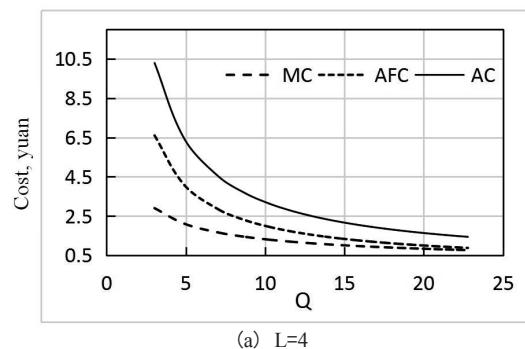
$$\beta = \frac{\ln(Q_2 / Q_3) - \ln(Q_1 / Q_2) \ln(L_2 / L_3) / \ln(L_1 / L_2)}{\ln(K_2 / K_3) - \ln(L_2 / L_3) \ln(K_1 / K_2) / \ln(L_1 / L_2)} \quad (7)$$

Here, TC is total cost; VC is variable cost. AC is average cost; MC is marginal cost; AFC is average fixed cost.

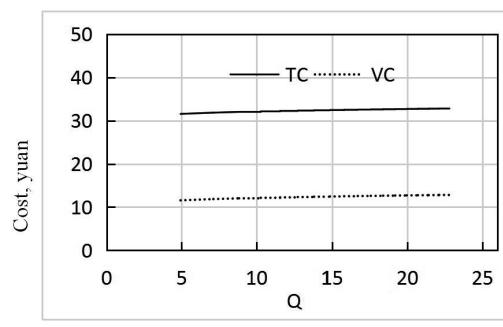
3. Discussion & Analysis

As to cost and quantity in Figure 2(a~d), it is found that the cost will decrease with the increasing quantity while AC is the highest cost then AFC the last MC. Meantime the cost AC and AFC is higher upon L=4 than L=6 while MC is higher upon L=6 than L=4. On the other hand the TC and VC is higher upon L=6 than that upon L=4, is the near parallel line they have. But their differences are a certain of several Yuans to save compare them each other. It explains that with the increasing labor to 6 the cost is slight high of several Yuans than 4. It is found that relationship of Q and cost in Figure 3(a &b) decreases with the increasing quantity while the same turn as Figure 2 above is owned ie. AC>AFC>MC. The AC and AFC decreases sharply when quantity decreases to 5 while MC

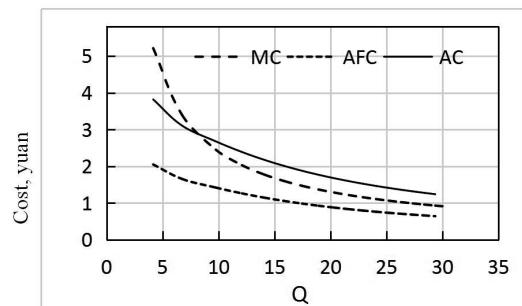
decreases slowly until 5. It explains that AC and AFC is main factors to affect quantity then MC do. It fits to concept of them well. However TC and VC increases from 20 and 0 to 80 and 60 with increasing quantity from 0 to 77. TC>VC is turn of them, it fits to concept of them well. The difference is 20 for them. TC and VC is main effective costs to compare with AC, AFC & MC.



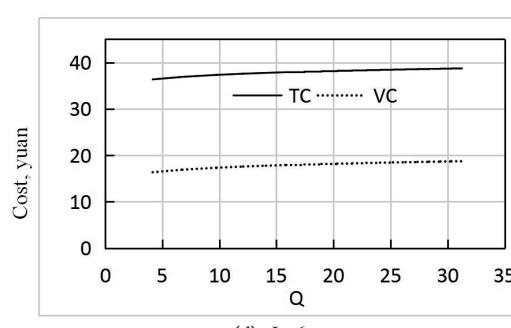
(a) L=4



(b) L=4

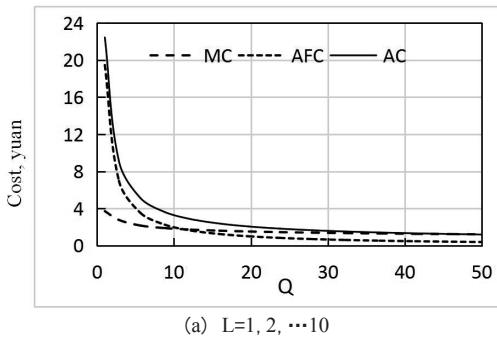


(c) L=6

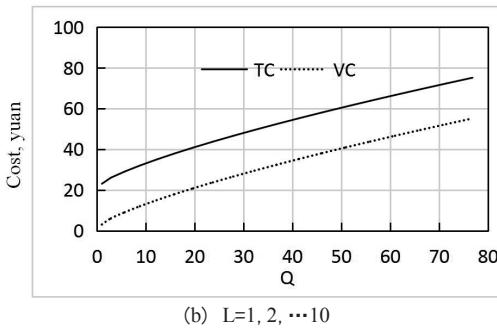


(d) L=6

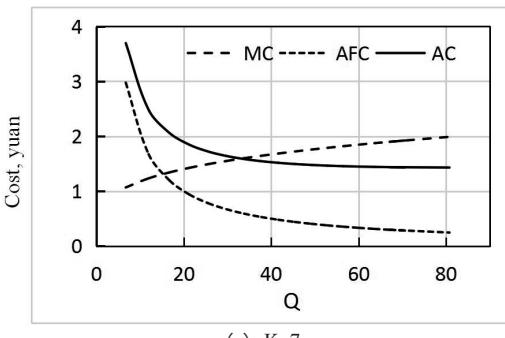
Figure 2. Relationship between cost and quantity in screw thread with different parameters L



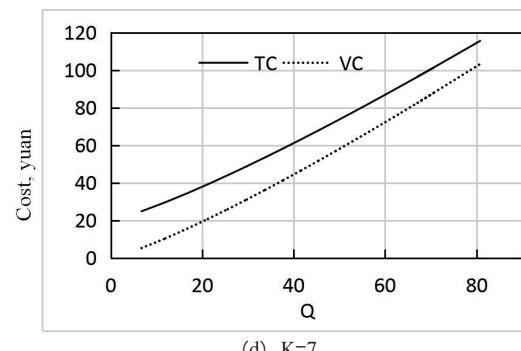
(a) L=1, 2, ...10



(b) L=1, 2, ...10



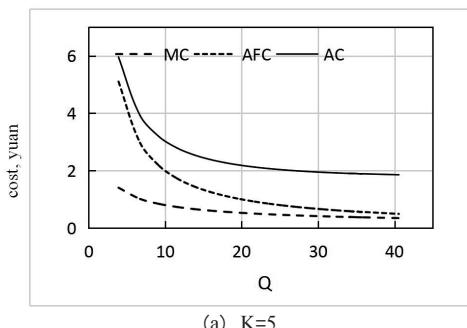
(c) K=7



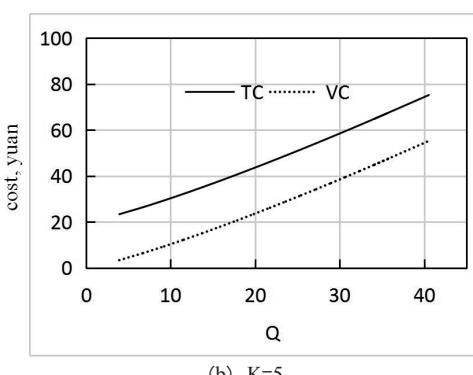
(d) K=7

Figure 3. Relationship between cost & quantity in thread

As shown in Figure 4(a-d) it is found that AC, AFC & MC have the same behavior as discussed above two Figures. Whereas in Figure 4(c) the MC is found to increase with Q upon K=7. The TC and VC become bigger upon K=5 than K=7 while their difference is 15 and 20 respectively. It explains that with the increasing K to 5 the TC and VC will increase a certain too.



(a) K=5



(b) K=5

Figure 4. Relations between cost & quantity in thread

4. Conclusions

(1) Overviews, the Q and cost decreases with the increasing quantity while the same turn as AC>AFC>MC is found. AC and AFC is main factors to affect quantity then MC do. It fits to concept of them well. The cost AC and AFC is higher upon L=4 than L=6 while MC is higher upon L=6 than L=4. Meantime the TC and VC is higher upon L=6 than that upon L=4, is the near parallel line.

(2) The TC>VC is turned to affect cost. There is a difference for them. TC and VC is main effective costs to compare with AC, AFC & MC. The TC and VC become bigger upon K=5 than K=7.

Foundation

This is financially supported by the Korea of National Research Foundation, under the Specified Base Program (Grant No. 96-0300-11-01-3).

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