

Review Article

The Model of Average Cost and Quantity with Labor and Capital on Hub Process in Dongyue of GM

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Abstract: As for GM (General Motor limited corporation) Dongyue company the car wheel hub is an important component. Therein it is needed to model to search its cost and quantity. For the sake of precision the whole data has been adopted subjective virtual one. After modeling the best labor is 5 whilst the best capital is 15. Furthermore the graph shows the better result to the workshop financial division to reserve and evaluate the economy and price for better turnover and profit finally. Through comparing these data in graph it is found the revenue is fit for it, no bigger regulation has been needed in general. Two machines is adopted to proceed the manufacture for the cost down and quantity. Meantime for the sake of more revenue it is suggested that low price will gain more revenue since the more quantity is sold. In general the machine quantity and price & goods quantity is the fundamental parameter.

Keywords: Model; average cost(AC); average fixed cost(AFC); average variable cost(AVC); average revenue(AR); hub process; GM & Dongyue.

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1. INTRODUCTION

The motor wheel hub process has been significant one for tire of cars. Therein the modeling cost will be needed to proceed cost evaluation such as AC, AFC, AVC and AR which are parameters for the process with model. For the sake of convenience the average costs have been adopted so it is proceeded with a certain depth research with high and low revenue. The best labor and capital will be solved after three coefficients on the other side they are determined according to the virtual fact. The three coefficients are α , β & γ . we adopt the preformed investigation and use 0.5times relation to deal with the labor and capital & quantity relationship. Then we do compute the best labor and capital to solve its value and on that base the graph is drawn with the model mentioned method.

Due to the cost saving the average cost is a necessary course to be thought due to its importance. Here the preforming investigation is proceeded and define the coefficients. Since ensuring that complete observation TC, TVC & TFC is saved. Margin cost (MC) is little therefore it is neglected. Average revenue is directly observed therefor the equation of curve is easy to build to check the turnover point ie. profit point is necessary to observe. Due to the area of intersection

of two equations is the judge point scope. It can be calculated by triangle area with crossing method. In order to acquire more benefit from product process it is wanted that the machine quantity. To guarantee the most benefit this is first parameter whilst low price is the necessary way to sell more goods. These are two factors to benefit from producing products. Only if the three parameters are considered the best benefit may be attained. The destination of this study has been benefit for company according to the simulation. Meantime the turnover point which is formed from AR and Cost is observed and searched in this study. For further research the parameter is studies that is ultimate destination too.

2. MODELING

The GM hub manufacture has been established according to modeling with economic and technological equations that has a important role in vehicles so Cobb-Douglas function is used to complete the modeling. The detail establishment and modeling is as references [1-6]. The calculated constant is $\gamma=0.5$; $\alpha=1.1$; $\beta=-0.12$ respectively. The parameter $P_l=20$ Yuan and $P_k=5$ Yuan. Turnover is in terms of 81 Yuan per minute and 60~73 Yuan/piece so use ARH and ARL represents average high turnover and low one respectively. The omitted

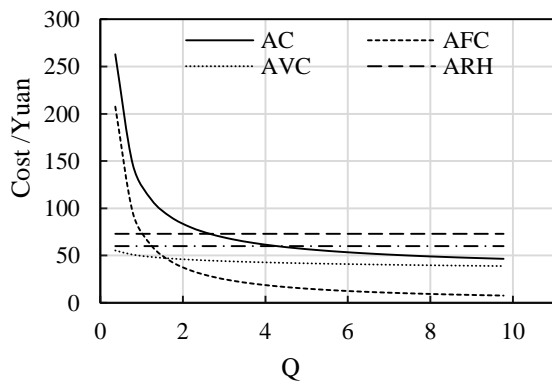
part in here isn't repeated due to last paper. [2~3] If there is problem it is checked kindly. The detail narration is expressed as below.

The best labor and capital may be solved firstly in terms of those three coefficients. The coefficients can be solved according to performing investigation. At last the average costs may be solved and drawing their relationship for us to find defined intrinsic nature. In this paper the average cost and quantity with a certain labors and capitals may be solved for that hub pressing in GM corp. It is notice that the hub pressing is high power process therefore the high labor and low capital will be adopted. It is proceeded that the discussion as below in detail.

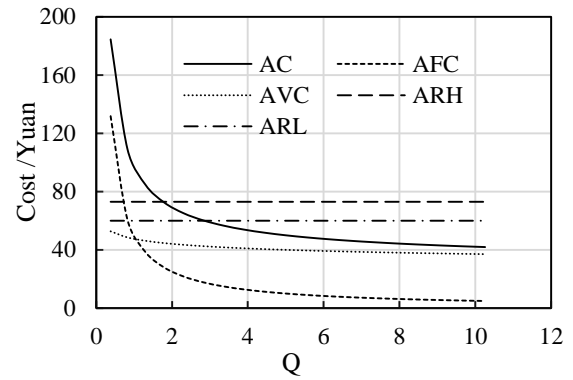
3. DISCUSSIONS

The Figure 1(a-e) shows that average cost may decline as the quantity increases. The revenue of high and low may fit to curve rightly. The K and L is divided into two parts with K=15 and 10 and L=3, 4 and 5 respectively. It is in terms of the best labor and capital has been solved with Cobb-Douglas function at three coefficients that is technique, producing labor & capital elasticity respectively. It is mentioned as above and now let's discuss as below in detail.

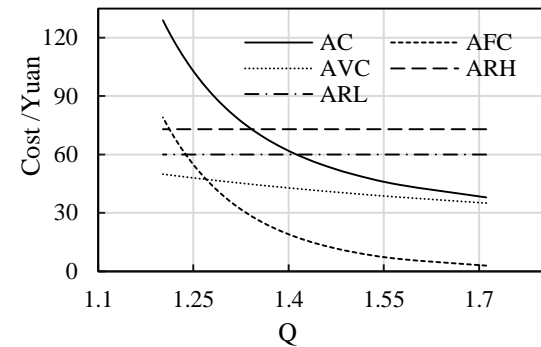
The AC, AVC and AFC will decrease when the quantity increases from the Figure 1(a-e). As seen in Figure 1(a) the 2.4 pieces is the turnover point with AC and ARH whilst 3.8 pieces is the second turnover point with AC and ARL. To require more profit the ARH 73 Yuan is used and longrun view the ARL 60 Yuan is fitted to. In Figure 1(e) the best point of turnover is 2.2 pieces which is lower one at K=15 when it is L=5 in Figure 1(d) from the labor view. Therein 2-4 pieces per minute is the best quantity in hub press for vehicle from Figure 1. That says that one or two machine is fitted to because they are needed 10~13 seconds to press the rod material. To ensure the cost declining the low price is needed therein the more quantity may be wanted to more than 5 which can use two machines to work for us to sell more Q so as to acquire more revenue.



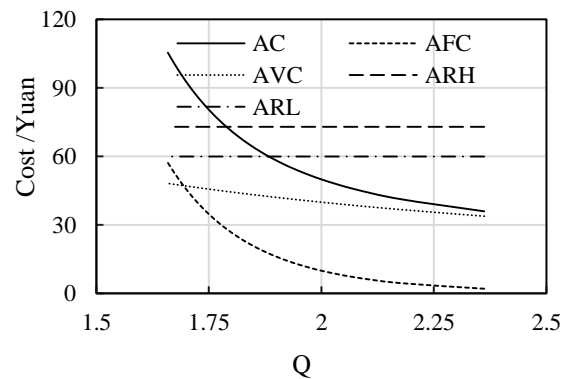
(a) K=15



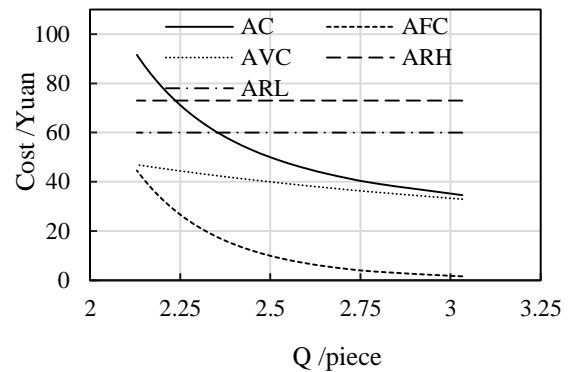
(b) K=10



(c) L=3



(d) L=4



(e) L=5

Figure 1: The average cost and quantity with labor and capital in wheel hub in GM of Dongyue

In general from the cost decreasing side the quantity of 3 is the best one in a forge machine per minute. Nevertheless the high cost will cause if the more machines are invested due to the high capital cost. Meantime the average fixed cost is the lowest one from the Figure 1 and then average variable cost is lower and in final the average cost is low. The turn of the lowest cost is $AVC > AFC > AC$. The turnover point may increase from 1.3 to 2.25 with labor increasing from 3 to 5 according to Figure 1(c~e). Therein the best point one is 2.25 with labor 5. The goods quantity has been more in capital than in labor. So the labor's one is preciser its scope is less than 1 piece. Therein the intersection is 2~4 in K whilst it is 1.3~2.3 in L. Only if it is combined with these two values the reasonable one may be exhibited. Therefore the 2.2~3.5 may be fit field for the hub pressing process. This one may represent the best value parameter within a minute.

4. CONCLUSIONS

The AC, AVC and AFC will decrease when the quantity increases. The 2.4 pieces is the turnover point with AC and ARH whilst 3.8 pieces is the second turnover point with AC and ARL. To require more profit the ARH 73 Yuan is used and longrun view the ARL 60 Yuan is fitted to. The best point of turnover is 2.2 pieces which is lower one at $K=15$ when it is $L=5$ from the labor view. Therein 2-4 pieces per minute is the best quantity in hub press for vehicle. That says that one machine is fitted to. The turn of the lowest cost is $AFC > AVC > AC$. The turnover point will increase as the

labor increases from 3 to 5. The best one is 2.2 with labor being 5 whilst it is 3~4 with capital being 15. Therefore the 2.2~3.5 may be fit field for the hub pressing process within a minute.

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