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Review Article

The Modelling for Flywheel Mass with Parameters in Motor Housing Punch Process

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Abstract: The mass of flywheel will incline as the punch speed inclines, it will decline as radius inclines. It would incline when the punch mould mass inclines. So it is chosen that big radius and small mould mass for saving cost of material and machine. The biggest mass of flywheel is about 1.3tons at 0.4m of radius and 6Kg of punch at the speed of 9m/s. So it is important for us to choose the punch mass. If it is 2Kg the biggest one will 400Kg at the speed of 9m/s at 0.4m. then choosing speed of punch is second factor. The rotation is first effect factor and then radius at last punch mass and its speed ie. n>r>m>v turn. Bigger force is big mass and speed in terms of energy conservation principle. So it is determined with bigger mass at certain speed.

Keywords: Modeling, flywheel, rotation, radius, motor housing process, parameter, cost control.

1. INTRODUCTION

The flywheel is used widely in punch machine since it has many function [1-6]. For instance it has reserved energy relieved impact and speed, it has many places to apply in modern industrial field. So it needs to be investigated in detail with a certain parameters for its wide usefulness in many machines. So in this study the flywheel mass with the rotation speed and its radius is modeled to find a certain intrinsic relations for process of motor housing punch. As we knew the flywheel is key part in punch machine in current factory. It can make many kinds of components for vehicle transformer and motor. Its role is important due to automatic production line. Moreover the few people is wanted there so many variable capital is saved. Its profit is huge for satisfying immense market demand. If machine happens to wrong the flywheel is key. Because its big rotary inertia and gravity it will deviate the central position. So the error will happen too. Because it can reserve the big energy to stabilize function to maintain a certain speed and force. Through different parameters to analyze the flywheel mass difference to find the design control method. Meantime by five parameters to look for the intrinsic correlation among them. Some methods are concluded in this study for production line convenience and reasonable designing and production feasibility. Smooth regulation is necessary and intelligent in production maker with punch mass and speed etc. For the artificial intelligence making the necessary value is grasped some that may relieve production burden. Further convenient communication with supplier will be feasible they can transform from simple supplier to major supplier link. The status is changed if so the stable and intelligent supply will be planed in future. If so the stabler and more developed company will be exhibited. The communication among us and suppliers will be strength more and more to skill complement in a period time. Two wins will be attained in a community. Furthermore in the design division the main parameters will be mastered further in order to happen low power phenomena.

Overview controlling flywheel mass is a significant matter so the relationship between their parameters will be found too.

2. MODELING

According to energy conservation principle it has

$$\frac{1}{2}m_1 v_1{}^2=\frac{1}{2}m_2 I_2 \omega_2{}^2 \text{ ---(1)}$$

Here it is supposed that flywheel has average disc shape since rotary inertia is

$I_2=\frac{1}{2}m_2{r_2}^2$ ----------(2)

Since

$v_2 = 2\pi nr/60$ -----(3)

And

$\omega_2 = v_2/r_2$ ---------(4)

So substitute (3) to (4） it has

$\omega_2 = 2\pi n/60$ -----(5)

Formula (2 &5) substitutes to (1) it has

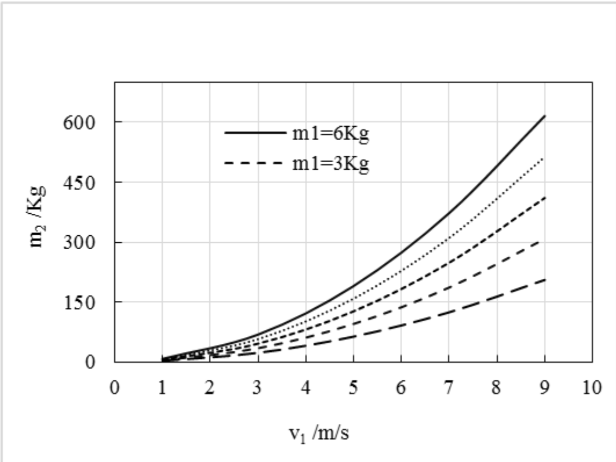
$m_2=2m_1{v_1}^2/(r_2\pi n/30)^2$ -----(6)

It forms the m formula.

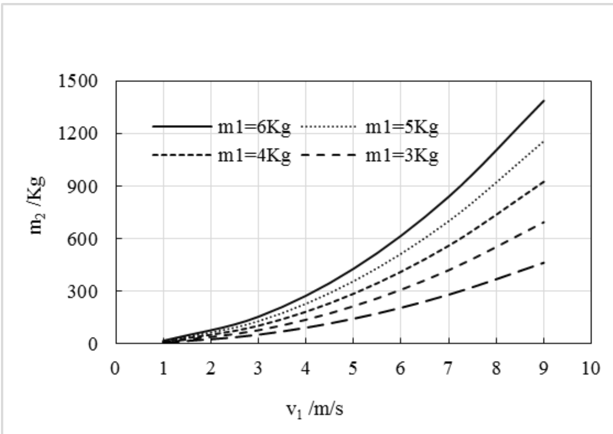
Here I_2 is rotary inertia to axis in flywheel; r_2 is its radius, m; m_2 is its mass, Kg; ω_2 is its rotation, r/min; v_2 is flywheel out speed; n is its rotation, r/m; m_1 is punch punch mass; v_1 is its speed.

3. DISCUSSIONS

The relation between flywheel mass and punch speed & punch mass etc. parameters are calculated in this paper. Here parameters are punch mass m_1, its speed $v_{1,}$ flywheel radius r and rotation n. They will be discussed in detail as below. The punch mass m is adopted by 3Kg, 4Kg, 5Kg and 6Kg respectively here which is by calculation. The speed of punch is adopted by 1m/s and 8m/s which may be gained through calculation as well. The relation between flywheel mass and punch speed is observed in this study.



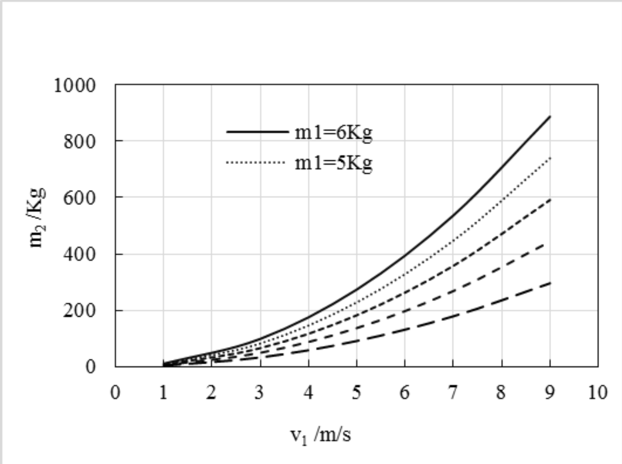
(a) r=0.6m



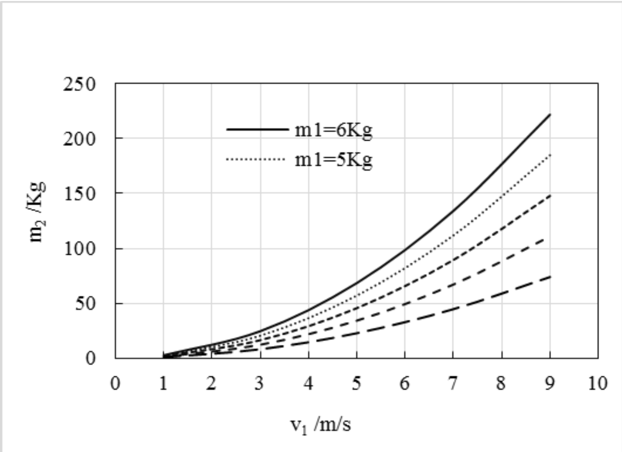
(b) r=0.4m

Fig-1: The curve of speed for punch v_1 and mass m_2 for flywheel at n=20r/m in punch motor housing.

The curve between flywheel mass and punch speed is searched as seen in Figure 1(a, b) and Figure 2(a, b). It is found that positive relation exists. So choosing little speed will help us save machine cost. When the flywheel mass attains 200Kg of its mass when the punch speed is 3m/s. It is chosen the punch speed is necessary in punch design. This is best one for the biggest flywheel mass in terms of Figure 1(b). The biggest flywheel one can attain 1.4 tons when punch one is 6KG at the punch speed of 9m/s. The lowest one is 400KG when punch mass is 2KG at the same punch speed. For the cost view the little flywheel mass and punch speed is found according to results at the r=0.4m.



(a) n=20r/m



(b) n=40r/m

Fig-2: The curve of speed for punch v_1 and mass m_2 for flywheel at r=0.5m in punch motor housing.

From Figure 2(a) it is found that it is better one. The biggest mass attains 900KG at the speed of n=20r/m. The baddest one is Figure 2(b) the biggest one is only 220KG at n=40r/m. so the turn n>r>m>v affects the flywheel mass which wields big force punch with low material. The cost control will be done according to the curves above four. We can only choose the conditions to minimize the materials. It can simply the choose course to satisfy our demand in designing the flywheel mass with punch movement.

If the value sent to maker the good effectiveness will be arrived for customer us even both. It can be according to making course and after that with measurement. It can also propose with modelling to correct deviation too. At the other side the mass of punch will be taken a role in design punch. Because it may affect the result of flywheel mass the course will be consideration factor. Use Lagrange formula to calculate to guarantee the parameter transfer. So the correct mass will be proposed upon it. The minimum one is mentioned as above with 3m/s.

Overview the n>r>m>v turn is gained in this study which expresses the effective size among all parameters. It is found that bigger flywheel mass is determined with bigger speed which can incline the punch force.

4. CONCLUSIONS

The littlest flywheel mass with 100Kg will be arrived when punch speed is 9m/s and 40r/m. it can be thought that reasonable one for saving cost. The largest one with 3Tons will be arrival when it is radius is 0.4m and 20r/m. so the rotation is first effect factor and then radius at last punch mass and its speed ie. n>r>m>v turn. According to this turn it may be designed reasonable flywheel mass. For the sake of cost declining the flywheel construction will be designed better than current is possible according to this study data. From the optimum views the low cost and low materials will be controlled in terms of the industrious demand. Bigger flywheel mass is affected by bigger punch speed.

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