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Problem Solving In Production of Internal Expanding Brake

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***Abstract*:-Problem solving in production of internal expanding brake**
Keywords- Design of spring; brake.

1. INTRODUCTION

Our research paper is based on joining process of brake liner with shoe during production. This brake liner is used in internal expanding brake which is used in automobile vehicle. In brake liner joining process nut and bolt assembly is used (fig.2). There are many types of problem create in production time,

(1) This process takes more time.
(2) More human effort required
(3) It reduce efficiency
(4) Low production

We research for removal of above all problems during production of brake liner. Instead of conventional process we use processes which is given below then above all problem can be removed. The processes are: Pneumatic process, Hydraulic process, spring assembly process

But spring assembly process is more efficient compare with the Pneumatic and Hydraulic process.

2. NUT AND BOLT ASSEMBLY PROCESS

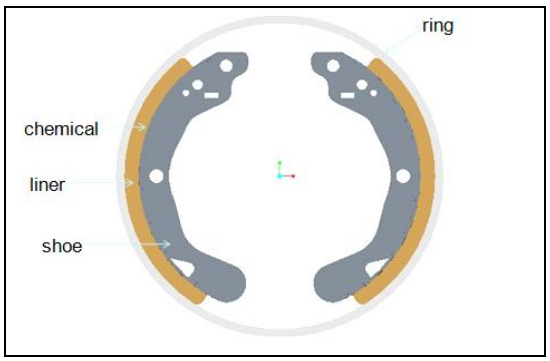

Fig (1): Shoe and brake

First of all shoes and linier are join with the help of a chemical. After then it kept in metal ring which are shown in fig (1).

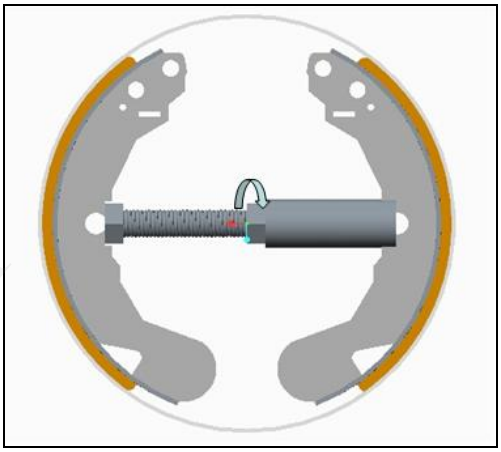

Fig (2): Nut and Bolt assembly

In this arrangement three things are used (1) Nut, (2) bolt and (3) hollow pipe. Nut is put between bolt and hollow pipe as shown in fig (2). Then a bolt and hollow pipe is kept between two shoes with use of centre moving nut.

After this arrangement put in oven at pressure 0.86184 N/mm² and temperature 150°C and then take out it after 30 minutes. This is the complete production process.

2.1 Problem Occurs In This Process

This process takes more time. More human effort is required. It uses mechanical instruments like hammer, wrench etc. It reduces efficiency.

3. PNEUMATIC PROCESS

First of all shoes and linier are joint with the help of a chemical. After then it kept in rounded metal ring.

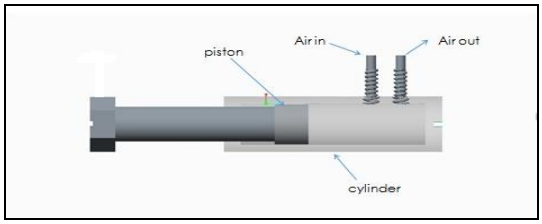

Fig (3): Pneumatic cylinder

After Pneumatic cylinder which are shown fig (3) is kept between two shoes and press the piston with the help of the air pressure.

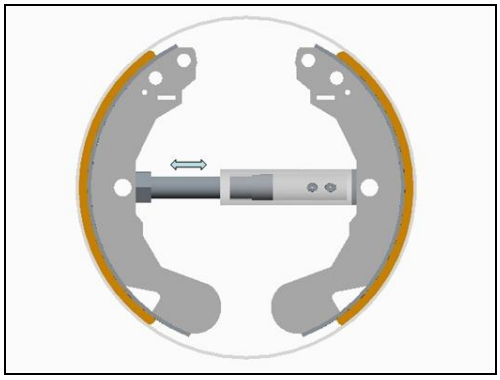

Fig (4): Pneumatic assembly

Pneumatic cylinder is now fixed between two shoe which are shown in fig (4)

3.1 Advantage Of This Pneumatic Process

This pneumatic process is faster than nut assembly process and efficiency is high.

3.2 Problem Occurs In This Pneumatic Process

In this process Air is used so Air leakage problem occurs in Pneumatic process.

4. HYDRAULIC PROCESS

Hydraulic process is same as the pneumatic process but the different is that fluid is used instead of the air.

4.1 Problem occurs in this Hydraulic process

In this process Hydraulic fluid is used so fluid leakage problem occurs in this hydraulic process

5. SPRING ASSEMBLY PROCESS

If a spring is designed which are stable at 150ºC and at 0.86184 N/mm² if spring assembly used instead of nut and bolt assembly then it require less time. It required less human effort and Efficiency increased.

5.1 Design of spring

For the design of spring material is selected which hardness and strength is high at above pressure and temperature. Select the spring which outer diameter, internal diameter, diameter of wire and deflection are able to produce 0.86184 N/mm² pressure. Design procedure of spring is shown in the calculation

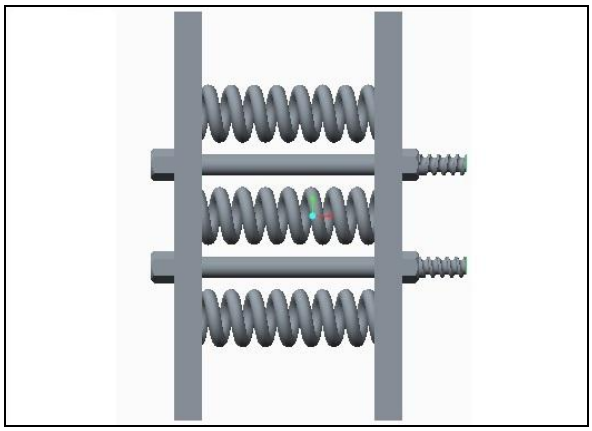

Fig (5): Design of spring

If spring clamp is used instead of nut and bolt assembly, so spring clamp process is faster than nut and bolt assembly process because in spring clamp process vice is use instead of hammer .Spring assembly shown in fig (3).

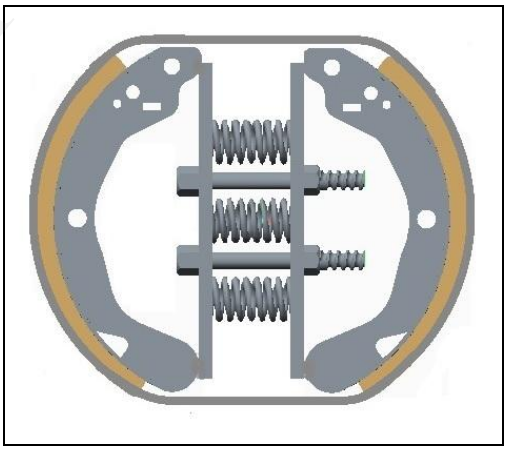

Fig (6): Design of assembly

6. MATERIAL OF CONSTRUCTION

Sr.	Name of the Part	Material
1	spring	Grade B2 iron
2	Ring	Spring steel
3	Shoe	iron
4	Linier	Mixture of asbestos and aluminium

7. CALCULATION

7.1 Calculation of Design:

Pressure: - 0.86184 N/mm²

Heat in oven: - 150°c

Time taken in oven: - 30 minutes

7.1.1 Formula

1. $\delta = 8*w*c^3*n/G*d$. (R.S. KHURMI) ...eq. (7.1.1)

Where,

δ = Deflection of spring, mm

W= Load, N

C= spring rate,

N= Number of terns,

G= Modulas of rigidity, KN/mm²

d= Diameter of wire, mm.

2. C = D/d (R.S. KHURMI) ...eq. (7.1.2)

Where,

C= spring index

D= Outer diameter of spring, mm

D= internal diameter of spring, mm

3. $A = \frac{\pi}{4}*D^2$ (R.S. KHURMI)...eq. (7.1.3)

Where,

A= Area of spring

D= Outer Diameter of spring

4. $\delta = 8*w*c^3*n/G*d$ (R.S. KHURMI) ...eq. (7.1.4)

$w = \delta*G*d/8*c^3*n$ (R.S. KHURMI) ...eq. (7.1.5)

7.1.2 Calculation

Assume that,

D = Outer spring diameter =20.80mm

d = diameter of coil = 4mm

$A = \frac{\pi}{4}*D^2$

$= \frac{3.14}{4}*(20.80)^2$

$= 339.662mm^2$

$C = \frac{D}{d}$

$= \frac{20.80}{4}$

$= 5.2$

$W = \frac{10*66*10^3*1}{8*(5.2)^3*8}$

$= 293.37N$

$P = \frac{W}{A}$

$= \frac{293.37}{339.662}$

$= 0.8637\ N/mm^2$

8. CONCLUSION

In reference of this paper we conclude that the use of this process take less time of production and get maximum efficiency.

9. REFERENCES

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