Oil Pump Rotor without Machining Treatment

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Abstract

Oil Pump rotor is essential parts for automobile and, it is consisted of drive rotor and driven rotor in general. These parts are requested different properties according to environment. There are 2 types of Oil Pump rotor according to its usage. One is used for electric system, and the other is used for shaft-driven system. Especially, high precision and functionality is required in electric pump, and cost reduction is required in shaft-drive pump without slowing down its performance. This paper is mainly describing about the non-machine treated shaft-drive pump, based on the trial sample producing process.

Keywords : Rotor Oil-Pump Runout

1. Introduction

Conventionally, many oil pump products are manufactured at our company. As for the oil pump product, the further high precision or the further low cost is demanded. Fig.1 is shown the process of typical oil pump rotor (DRIVEN ROTOR).

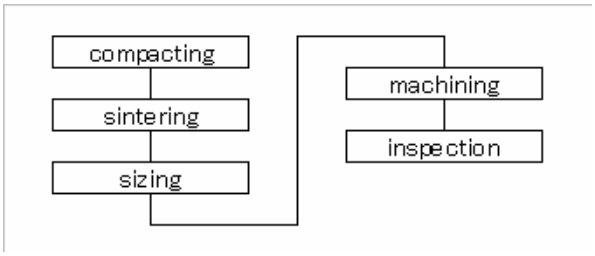

Fig. 1. Product process of oil-pump

In general, sintered oil pump is produced by compacting, sintering, sizing, machining, inspection. In order to dcrease cost, it is desired that machining process is skipped.
This paper explains the oil pump rotor without machining an outer diameter.

2. Experimental and Results

It was required to secure accuracy, in order to manufacture without machining an outer diameter. The accuracy of the runout of inner diameter and outer diameter is secured especially. In order to solve this problem, the press parts which can improve runout were devised. Fig2 is shown press parts to improve diameter.

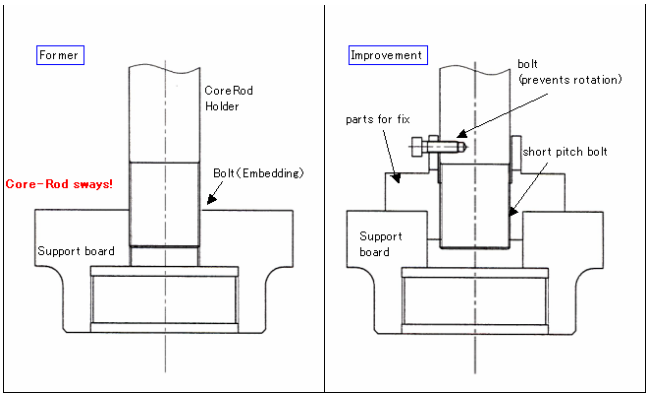

Fig. 2. Formal and improvement press parts

Table 1. Runout comparison

Runout of the outer diameter on the basis of the inner diameter (Actual measurement)

No.	Before improving	After improving
1	0.038	0.018
2	0.042	0.022
3	0.040	0.019
4	0.036	0.020
5	0.040	0.021
6	0.035	0.018
7	0.037	0.024
8	0.041	0.018
9	0.038	0.022
10	0.042	0.019
Ave.	0.039	0.020

Table 2. Difference in process, and comparison of cost

general process

Process	Part	Cost
Cutting	– one side surface – outer diameter	1
Grinding	– both surface – outer diameter	
Deburring		

without machining process

Process	Part	
Cutting	– one side surface	0.7 (30%down)
Grinding	– both surface	
Deburring		

Table1 is shown runout comparison. Table2 is shown cost comparison between general process and improved process. We improved accuracy of the outer diameter and decreased 30% of cost.

Fig.3 is shown quick setting type. Although parts are set, very long time is needed. In order to solve the problem, we devised the parts which can be set still more efficiently. As a result of using the system, it was able to manufacture without accuracy getting worse.

Moreover, when set time became short, productivity improved.

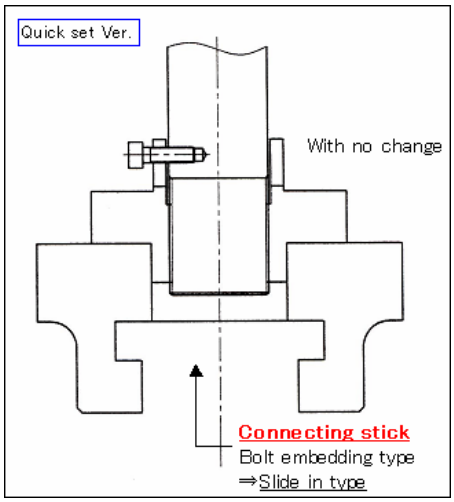

Fig. 3. Quick setting type

3. Summary

By this system, we succeeded in manufacturing an oil pump without machining an outer diameter. It was able to use for the improvement of cost greatly.

4. References

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